ICOM

SERVICE MANUAL

DUAL BAND FM TRANSCEIVER

IC-W21A
IC-W21E

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the IC-W21A/E DUAL BAND FM TRANSCEIVER at the time of publication.

MODEL	VERSION No.	VERSION	SYMBOL
IC-W21A	#05	U.S.A.	USA
	#07	Australia	AUS
	#09	Asia	SEA
IC-W21E	#02	Europe	EUR
	#03	U.K.	UK
	#04	Italy	ITA

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 16 V. This will ruin the transceiver.

DO NOT expose the transceiver to rain, snow or any liquids.

DO NOT reverse the polarities of the power supply when connecting the transceiver.

DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front end.

ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<SAMPLE ORDER>

1140003590	IC	HD404629A59H	IC-W21A	LOGIC UNIT	5 pieces
8810005360	Screw	PH M2 x 3 ZK	IC-W21E	Front panel	10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits of electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 40 dB – 50 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to the transceiver.

TABLE OF CONTENTS

SECTION 1 SPECIFICATIONS .... **1 – 1**

SECTION 2 INSIDE VIEWS .... **2 – 1 ~ 2**

2 – 1 LOGIC UNIT .... 2 – 1
2 – 2 VHF RF UNIT .... 2 – 2
2 – 3 UHF RF UNIT .... 2 – 2

SECTION 3 DISASSEMBLY INSTRUCTIONS .... **3 – 1**

SECTION 4 CIRCUIT DESCRIPTION .... **4 – 1 ~ 6**

4 – 1 RECEIVER CIRCUITS .... 4 – 1
4 – 2 TRANSMITTER CIRCUITS .... 4 – 3
4 – 3 PLL CIRCUITS .... 4 – 4
4 – 4 OTHER CIRCUITS .... 4 – 5
4 – 5 PORT ALLOCATIONS .... 4 – 5

SECTION 5 ADJUSTMENT PROCEDURES .... **5 – 1 ~ 5**

5 – 1 PREPARATION BEFORE SERVICING .... 5 – 1
5 – 2 PLL ADJUSTMENT .... 5 – 2
5 – 3 RECEIVER CIRCUIT .... 5 – 2
5 – 4 TRANSMITTER ADJUSTMENT .... 5 – 4

SECTION 6 PARTS LIST .... **6 – 1 ~ 11**

SECTION 7 MECHANICAL PARTS AND DISASSEMBLY .... **7 – 1 ~ 2**

7 – 1 CHASSIS PARTS .... 7 – 1
7 – 2 ACCESSORIES .... 7 – 1

SECTION 8 BOARD LAYOUTS .... **8 – 1 ~ 9**

8 – 1 V-L BOARD, CONNECT UNIT AND CHARGE ADAPTER (AD-25) .... 8 – 1
8 – 2 LOGIC UNIT AND TSQL UNIT .... 8 – 2
8 – 3 VHF RF UNIT .... 8 – 4
8 – 4 UHF RF UNIT .... 8 – 7

SECTION 9 BLOCK DIAGRAM .... **9 – 1**

SECTION 10 VOLTAGE DIAGRAM .... **10 – 1 ~ 2**

To upgrade quality, all electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage :

MODEL	VERSION	FREQUENCY COVERAGE	
		VHF	UHF
IC-W21A	U.S.A.	144–148 MHz (Tx) 138–174 MHz* (Rx)	440–450 MHz
	Australia	144–148 MHz	430–440 MHz
	Asia	144–148 MHz (Tx) 138–174 MHz* (Rx)	
IC-W21E	Italy		
	Europe	144–146 MHz	
	U.K.		

* Guaranteed frequency coverage is 144–148 MHz.

- Mode : F3 (FM)
- Antenna impedance : 50 Ω (unbalanced)
- Usable temperature range : –10 °C to +60 °C (–14 °F to +140 °F)
- Frequency stability : ±5 ppm (0 °C to +50 °C; +32 °F to +122 °F)
- External DC power supply : 6–16 V DC (negative ground)
- Current drain (Typical) :

CONDITION			VHF	UHF
TRANSMIT (DC 13.5 V)	High		1.4 A	1.5 A
	Low 1		500 mA	600 mA
RECEIVE (DC 12.5 V)	MONO BAND	Power saved	15 mA*	
		Rated audio output	150 mA	
	DUAL BAND	Power saved	30 mA*	
		Rated audio output	200 mA	

* Average value

- Dimensions (projections not included) : 57 (W) x 125 (H) x 35 (D) mm; 2.2 (W) x 4.9 (H) x 1.4 (D) in (with BP-131 or BP-130)
  57 (W) x 153 (H) x 35 (D) mm; 2.2 (W) x 6.0 (H) x 1.4 (D) in (with BP-132)
- Weight : 390 g; 13.8 oz (with BP-131; Australia, Europe, Italy, U.K., U.S.A.)
  : 380 g; 13.4 oz (with BP-130; Asia)

■ RECEIVER

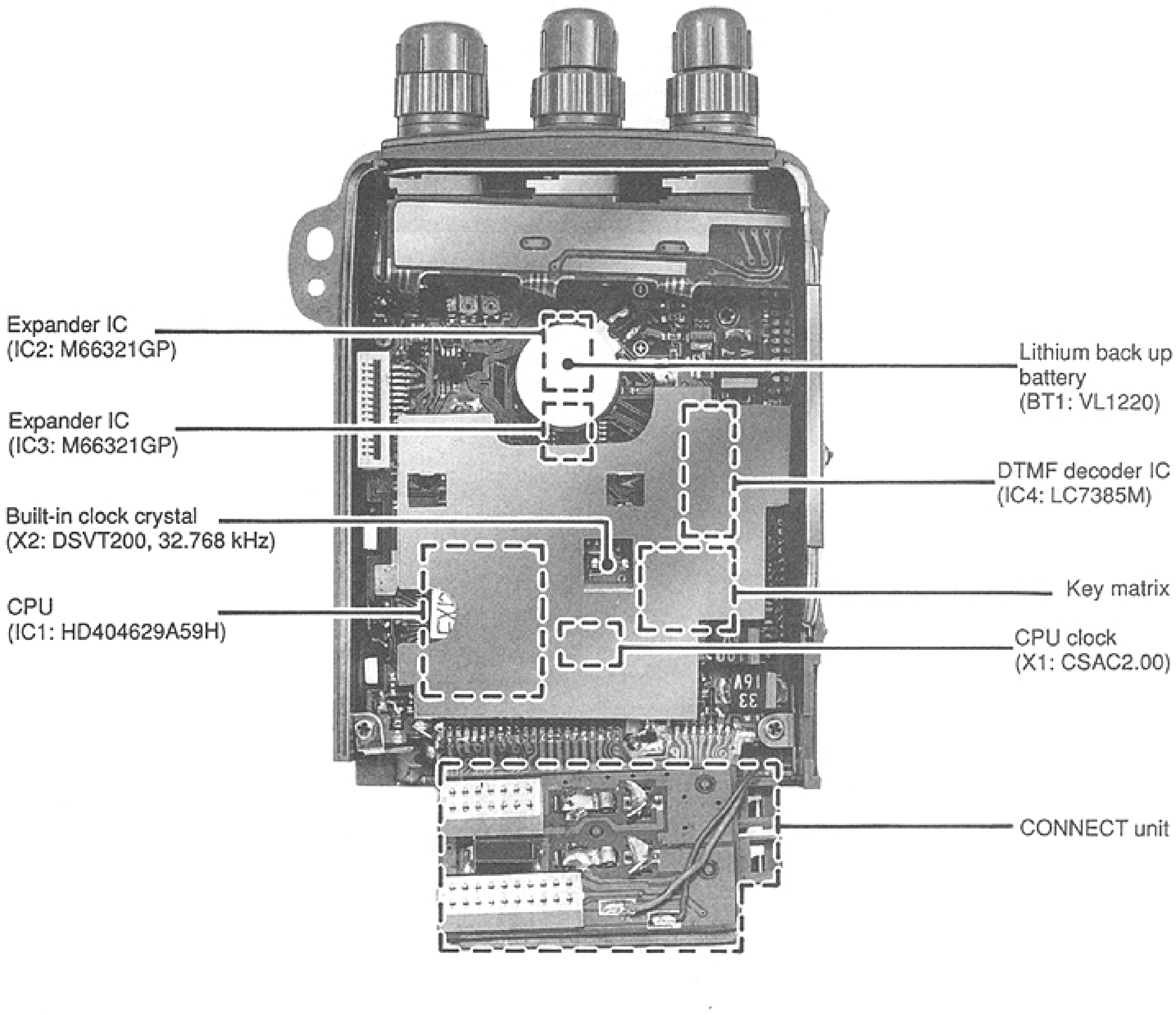
- Sensitivity : Less than 0.16 μV for 12 dB SINAD
- Receive system : Double-conversion superheterodyne
- Intermediate frequencies : VHF; 1st 43.100 MHz, 2nd 455 kHz
  UHF; 1st 35.800 MHz, 2nd 455 kHz
- Selectivity : More than 15 kHz/–6 dB, less than 30 kHz/–60 dB
- Audio output power : More than 0.2 W at 10 % distortion with an 8 Ω load and DC 12.5 V
- Spurious rejection : Less than –60 dB

■ TRANSMITTER

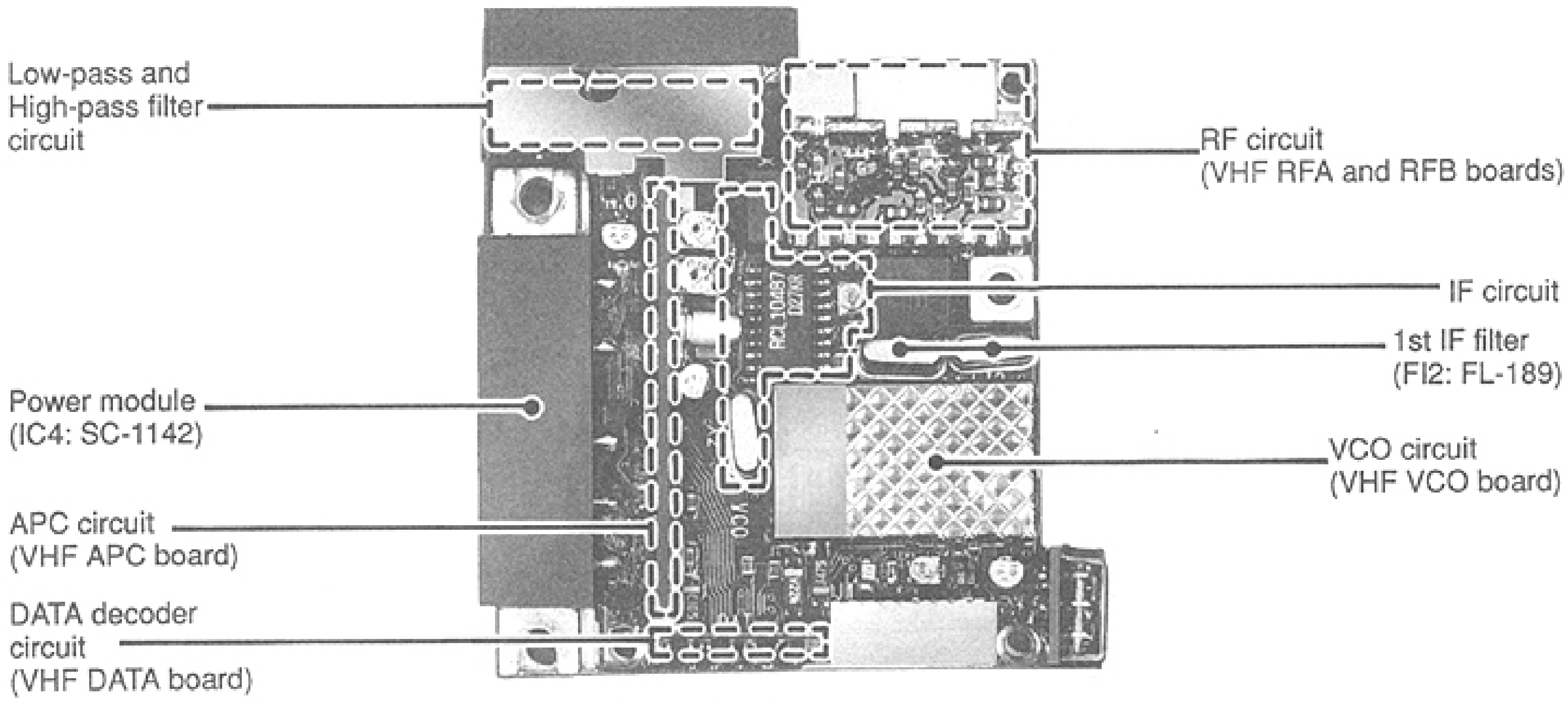
- Output power (at 13.5 V) : 5 W (HIGH), 3.5 W (LOW3), 1.5 W (LOW2), 0.5 W (LOW1), 0.015 W (ELOW)*
  * DC power supply voltage of DC 7.2 V.
- Modulation system : Variable reactance frequency modulation
- Max. frequency deviation : ±5 kHz
- Spurious emissions : Less than –60 dB (at 25 °C; +77 °F)
- Microphone impedance : 2 kΩ

All stated specifications are subject to change without notice or obligation.

2-1 LOGIC UNIT

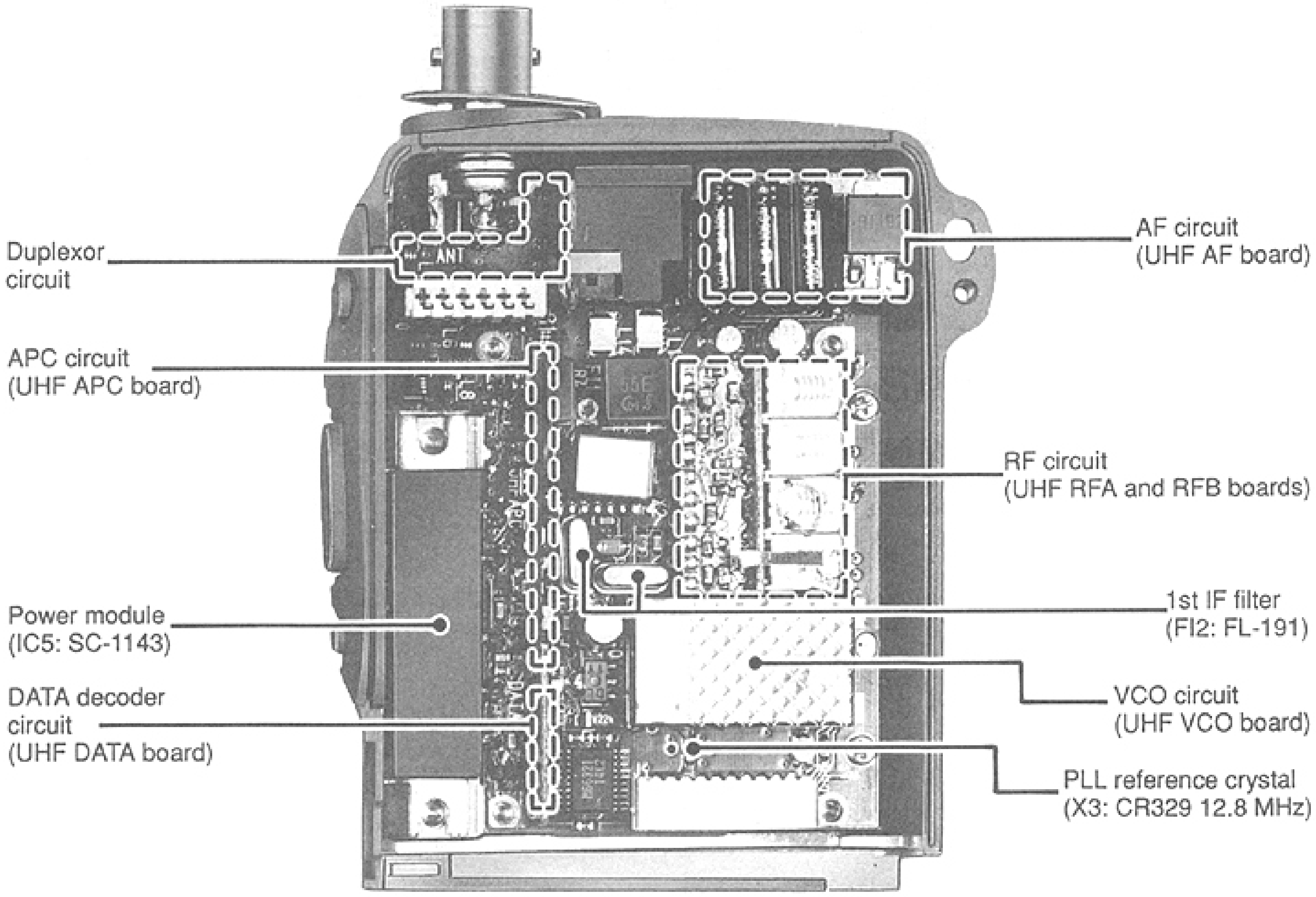

Expander IC
(IC2: M66321GP)
Expander IC
(IC3: M66321GP)
Built-in clock crystal
(X2: DSVT200, 32.768 kHz)
CPU
(IC1: HD404629A59H)
Lithium back up battery
(BT1: VL1220)
DTMF decoder IC
(IC4: LC7385M)
Key matrix
CPU clock
(X1: CSAC2.00)
CONNECT unit

2-2 VHF RF UNIT



Low-pass and High-pass filter circuit
Power module (IC4: SC-1142)
APC circuit (VHF APC board)
DATA decoder circuit (VHF DATA board)
RF circuit (VHF RFA and RFB boards)
IF circuit
1st IF filter (FI2: FL-189)
VCO circuit (VHF VCO board)

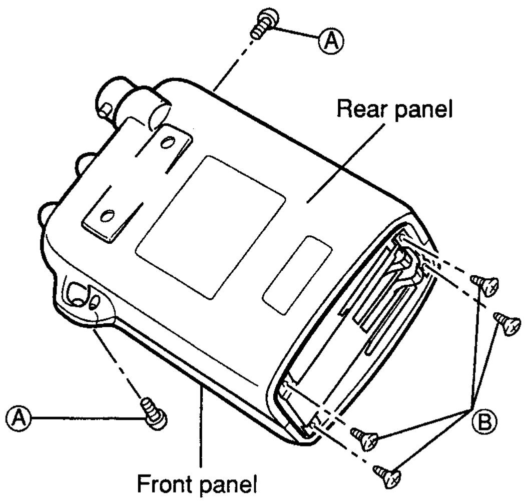
2-3 UHF RF UNIT



Duplexor circuit
APC circuit (UHF APC board)
Power module (IC5: SC-1143)
DATA decoder circuit (UHF DATA board)
AF circuit (UHF AF board)
RF circuit (UHF RFA and RFB boards)
1st IF filter (FI2: FL-191)
VCO circuit (UHF VCO board)
PLL reference crystal (X3: CR329 12.8 MHz)

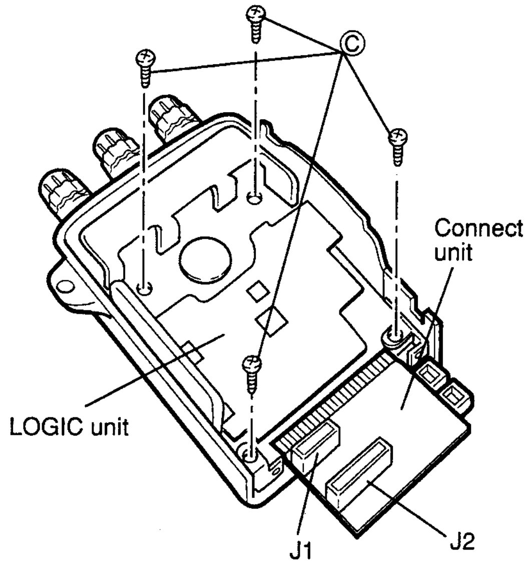
SECTION 3 DISASSEMBLY INSTRUCTIONS

Fig. 1


Ⓐ
Rear panel
Ⓐ
Ⓑ
Front panel

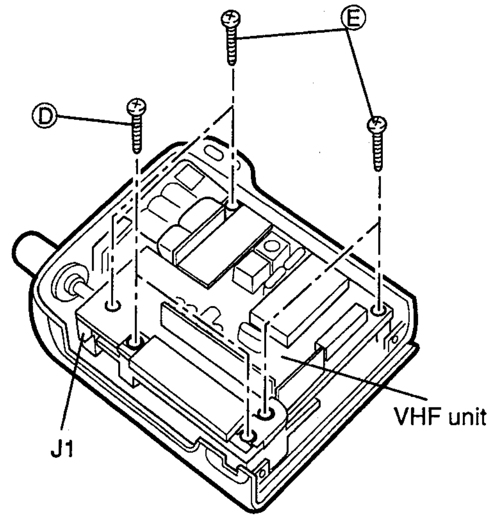
① Remove 2 screws, Ⓐ (black, 3 mm), and 4 screws, Ⓑ (flat head, 2.5 mm), to open the front panel.

Fig. 2


Ⓒ
Connect unit
LOGIC unit
J1
J2

② Unplug J1 and J2 to separate front and rear panel, then remove 4 screws, Ⓒ (silver, 4.5 mm), to remove the LOGIC unit from the front panel.

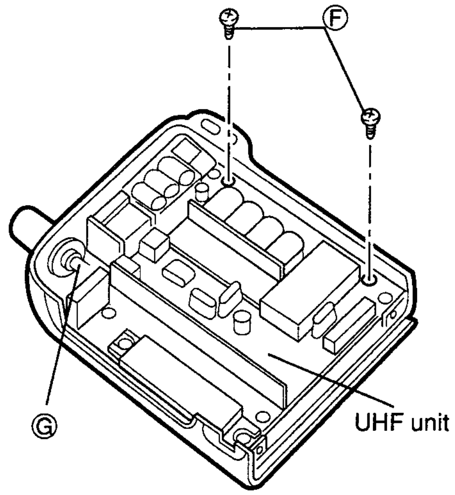
Fig. 3



③ Remove 6 screws, Ⓓ (14.5 mm x 2 pcs.) and Ⓔ (nickel, 14 mm x 4 pcs.).

④ Unplug J1 to remove the VHF unit and RF chassis plate.

Fig. 4



⑤ Remove 2 screws, Ⓕ (nickel, 2.5 mm), and unsolder the point Ⓖ to remove the UHF unit.

SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 DUPLEXER CIRCUIT (UHF RF UNIT)

The transceiver has a duplexer (low-pass and high-pass filter) on the first stage from the antenna connector to separate the signals into VHF and UHF signals. The low-pass filter (L16, L17, C52) for VHF signals and the high-pass filter (C40–C44, L11, L12) for UHF signals. The separated signals are applied to each RF circuit.

4-1-2 VHF ANTENNA SWITCHING CIRCUIT (VHF RF UNIT)

The antenna switching circuit functions as a low-pass filter while receiving. However, its impedance becomes very high while transmitting by grounding cathode of D16 (except for at E-low power). Thus, transmit signals are blocked from entering the receiver circuits. The antenna switching circuit employs a 1/4λ type diode switching system. The passed signals are then applied to the RF amplifier circuit.

4-1-3 VHF RF CIRCUIT (VHF RFA BOARD)

The RF circuit amplifies signals within the range of frequency coverage and filters out-of-band signals.

The signals from the antenna switching circuit pass through a band-pass filter (L1, D2), and are applied to the RF amplifier (Q1, Q2). The RF amplifier consists of a cascade circuit. The amplified signals are passed through the next stage band-pass filter (L2, L3, D4, D5) to suppress unwanted signals. The filtered signals are then applied to the 1st mixer circuit (VHF RF unit, Q5).

D2, D3 and D5 employ varactor diodes that track the band-pass filters and are controlled by the PLL lock voltage. These diodes tune the center frequency of an RF passband for wide bandwidth receiving and good image response rejection.

4-1-4 VHF 1ST MIXER AND 1ST IF CIRCUITS (VHF RF UNIT)

The 1st mixer circuit converts the received signal to a fixed frequency of the 1st IF signal with a PLL output frequency. By changing the PLL frequency, only the desired frequency will be passed through a pair of crystal filters at the next stage of the 1st mixer.

The signals from the VHF RFA board are mixed with the 1st LO signal from the VCO circuit (VHF VCO board) to produce a 43.10 MHz 1st IF signal.

After passing through the matching circuit (L1), the 1st IF signal is applied to a pair of crystal filters (FI2) to suppress out-of-band signals. The 1st IF signal is amplified at the IF amplifier (Q4) and applied to the 2nd mixer circuit (IC1).

4-1-5 U/U FUNCTION AMPLIFIER

For the U/U function, the VHF RF unit includes a UHF amplifier and a mixer circuit.

UHF RF signals from the UHF RF unit (via J2, U/U ANT terminal) are amplified at Q9 and Q8, and mixed with the PLL output at Q7. A doubled signal from the VHF VCO board is used as PLL output for UHF signal conversion. The mixed signal (43.10 MHz IF signal) is applied to an IF filter (FI2).

4-1-6 VHF 2ND IF AND DEMODULATOR CIRCUITS (VHF RF UNIT)

The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal. A double superheterodyne system (which converts receive signals twice) improves the image rejection ratio and obtains stable receiver gain.

The 1st IF signal from the FI2 is applied to the 2nd mixer section of IC1 (pin 20), and is mixed with the 2nd LO signal to be converted to a 455 kHz 2nd IF signal.

IC2 contains the 2nd mixer, 2nd local oscillator, limiter amplifier and quadrature detector circuits. The 2nd local oscillator section and X2 generate 42.645 MHz for the 2nd LO signal.

The 2nd IF signal (455 kHz) from the 2nd mixer (IC1, pin 4) passes through the ceramic filter (FI1) where unwanted signals are suppressed. It is then amplified at the limiter amplifier section (IC1, pin 6) and applied to the quadrature detector section (IC1, pin 9 and ceramic discriminator X1) to demodulate the 2nd IF signal into AF signals.

AF signals output from IC1 (pin 11) are applied to the AF amplifier (Q16, Q17: LOGIC unit), DTMF decoder and optional tone squelch circuits (TSQL unit). The S-meter output "L SD" signal from IC1 (pin 12) is applied to the CPU from IC1 (pin 12). See Figure 1.

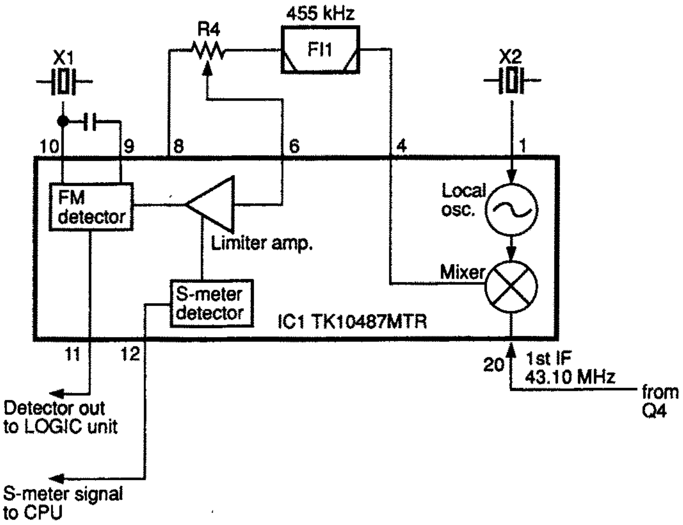


Fig. 1 VHF 2ND IF AMPLIFER

4-1-7 VHF AF AMPLIFIER CIRCUIT (LOGIC UNIT)

The AF amplifier circuit, including an AF mute switch, amplifies the demodulated signal to drive a speaker. For the separate speaker function, 4 multiplexers and a stereo power amplifier are used.

AF signals are applied to Q16 and Q17. Q16 is an active filter that functions as a high-pass filter to suppress sub-audible tone signals for tone squelch operation. Q17 is also an active filter that functions as a low-pass filter to suppress higher noise signals.

The filtered signals pass through the AF mute switch (Q18) and [VOL] control (R1) on the V-L board and are then applied to the multiplexers (IC8 and IC22). When the VHF audio is selected to the internal speaker by the separate speaker function, AF signals are applied to the one of the separate inputs of the stereo AF power amplifier (AF board IC1, pin 6); when the external speaker is selected, AF signals are applied to IC1, pin 7. See Figure 2.

4-1-8 VHF NOISE SQUELCH (LOGIC UNIT)

A noise squelch circuit cuts out AF signals when no RF signal is received. By detecting noise components in the AF signal, the squelch circuit switches the AF mute switches.

Some of the noise components in the AF signal from IC1 (pin 11: VHF RF unit) are applied to the noise amplifier (IC7). The [L SQL] control, R1 on the V-L board, adjusts the IC7 input level.

The noise amplifier (IC7) amplifies noise components of frequencies of 20 kHz and above. Output signals are rectified by D12 for conversion to DC voltage.

The rectified voltage triggers the squelch switch (Q15). The squelch switch sets the "LBUSY" line "HIGH/LOW" to apply the signal to the CPU (IC1, pin 41). Then the CPU outputs the L-MUTE and BUSY LED signals.

The L-MUTE signal, decoded at the output expander (IC3), activates the AF mute circuit (Q18) to cut the VHF AF signals. The BUSY LED signal is applied to the LED drive (Q4).

The voltage regulator (Q1, Q2: AF board) supplies power to the AF power amplifier. The AF ON signal from the data expander (IC2: LOGIC unit) controls Q2 (AF board) to reduce the current drain while the squelch is closed.

4-1-9 UHF RF CIRCUIT (UHF RF UNIT UHF RFA BOARD)

Antenna-in signals are divided between VHF RF signals and UHF RF signals at the duplexer (L11, L12, C40–C44, L16, L17, C52).

The UHF RF signals are passed through the band-pass filter (L8–L12, C35–C44) and antenna switching circuit (L5, L6, D5, D6, D15, C30, C31). The UHF RF signals are then amplified at the RF amplifiers (Q2, Q1). Helical band-pass filters (L2, L1) are used at the last stage of these amplifiers.

4-1-10 UHF 1ST MIXER AND 1ST IF CIRCUIT (UHF RF UNIT)

The signals from the UHF RFA board are mixed at Q2 with a 1st LO signal coming from the UHF VCO circuit (UHF VCO board: Q2, D1) to produce a 35.8 MHz 1st IF signal.

The 1st IF signal passes through the pair of crystal filters (FI2) and is then amplified at Q1 and applied to the FM IF IC (IC1, pin 16).

4-1-11 UHF 2ND IF AND DEMODULATOR CIRCUITS (UHF RF UNIT)

A 2nd mixer, 2nd IF, 2nd local oscillator, limiter amplifier, quadrature detector circuit and S-meter detector circuit are incorporated in the IC1. The 2nd local oscillator section and X2 generate a 35.345 MHz for the 2nd LO signal.

A 35.345 MHz signal is mixed with the 1st IF signal to produce the 2nd IF signal (455 kHz) at IC1. The 2nd IF signal from pin 3 is applied to pin 5 through the ceramic filter (FI1) and is amplified at the limiter amplifier section in IC1. It is then applied to the quadrature detector section (IC1, pins 5, 8 and ceramic discriminator X1) to demodulate the 2nd IF signal into an AF signal.

The signal is output from IC1 (pin 9) as a "HDET" signal and then applied to the AF circuit (LOGIC unit).

The S-meter output "H SD" signal is applied to the CPU (IC1 pin 3) on the LOGIC unit from IC1 (pin 13) on the UHF RF unit.

4-1-12 UHF AF CIRCUIT (LOGIC UNIT)

The AF "HDET" signals from IC1 (pin 9) on the UHF RF unit are applied to the active filter (Q12, Q14) on the LOGIC unit. The filtered signals pass through the AF mute switch (Q13) and [H VOL] control (R2) on the V-L board and are then applied to the AF power amplifier (IC1) on the AF board via the multiplexers (IC11, IC21).

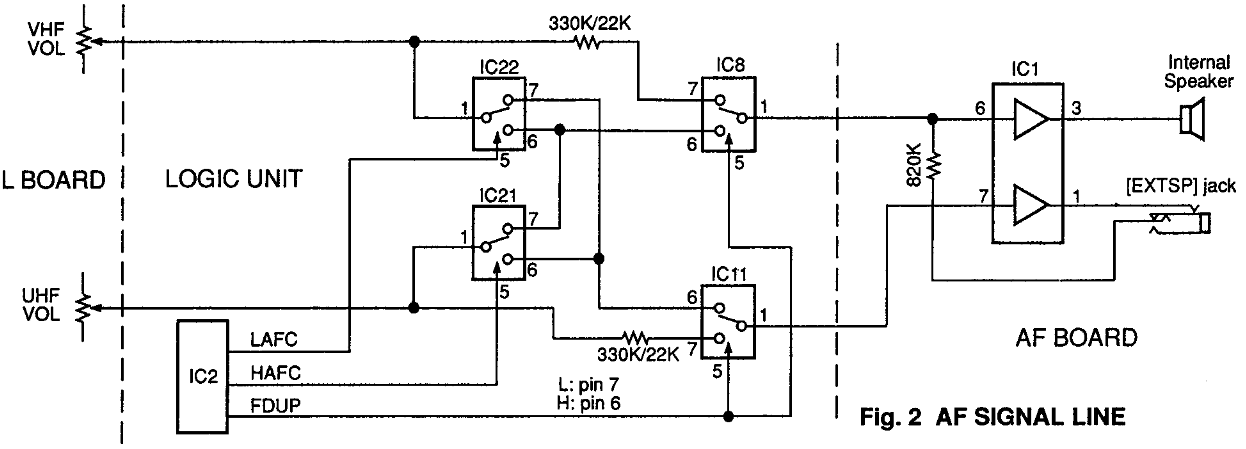


Fig. 2 AF SIGNAL LINE

4-1-13 UHF SQUELCH CIRCUIT (LOGIC UNIT)

Some of the noise components in the AF signal from IC1 (pin 9) on the UHF RF unit are applied to the noise amplifier (IC10). The [H SQL] control, R2 on the V-L board, adjusts the IC10 input level. IC10 amplifies noise components and D6 rectifies them for conversion to DC voltage.

The rectified voltage triggers the squelch switch (Q10). The squelch switch controls the "HBUSY" signal to inform the CPU (IC1, pin 24).

4-2 TRANSMITTER CIRCUITS

4-2-1 MICROPHONE AMPLIFIER CIRCUIT (LOGIC UNIT)

The microphone amplifier circuit amplifies audio signals with +6 dB/octave pre-emphasis from the microphone to a level needed for the modulation circuit. The microphone amplifier circuit is used for both the VHF and UHF bands.

The AF signals from the built-in condenser microphone, or from the [MIC] jack, pass thorough the microphone selector (IC19, pins 6, 1) and are then applied to the microphone amplifier (IC17a, pin 3).

The output signals from IC17a (pin 1) pass through the AF selector (IC18 pins 6, 1) and are then applied to the splatter filter (IC17b, pin 5) where signal components greater than 3 kHz are attenuated. The output signals from IC17b (pin 7) are then separately applied to the VHF VCO circuit (VHF VCO board) as an "L MOD" signal and to the UHF VCO circuit (UHF VCO board) as an "H MOD" signal.

4-2-2 VHF MODULATION CIRCUIT (VHF VCO BOARD)

The modulation circuit modulates the VCO oscillating signal (RF signal) using the microphone audio signals.

The "L MOD" signal changes the reactance of a diode (D2) to modulate the oscillated signal at the VHF VCO circuit (Q1, Q2, D1). The VCO output is buffer-amplified at Q3 and Q16 on the VHF RF unit and is then applied to the transmit/receive switching circuit (D4, D5) on the VHF RF unit.

4-2-3 VHF DRIVE AMPLIFIER CIRCUIT (VHF RF UNIT)

The drive amplifier circuit amplifies the VCO oscillating signal to the needed level at the power amplifier.

The signal from the transmit/receive switching circuit (D5) is amplified at the drive amplifiers (Q17, Q18) to obtain approx. 15 mW.

When low power (E LOW) is selected, the output of the drive amplifier (Q18) bypasses the RF power amplifier through D7. The signal is passed through the low-pass filter (C38-C39, L6, L7) and is then applied to the antenna connector. At this point, half of the antenna switching circuit (D1) is turned OFF to prevent the output power from entering the receiver circuit.

4-2-4 VHF POWER AMPLIFIER CIRCUIT (VHF RF UNIT)

IC4 is a power module which provides more than 5 W of output power with a 13.5 V DC power source.

An RF signal from the drive amplifier (Q18) is applied to IC4. The amplified signal is then applied to the antenna connector via the transmit/receive switching circuit (D12) and band-pass filter.

4-2-5 VHF APC CIRCUIT (VHF RF UNIT AND VHF APC BOARD)

The APC circuit protects the power module (IC4) from a mismatched output load and selects HIGH, LOW1, LOW2 or LOW3 output power.

When the antenna impedance is matched at 50 Ω, the voltage detected at the APC detector circuit (L16, D9, D10, D11) is at its minimum. The detected voltage is applied to an APC amplifier Q4 (R6 side) on the VHF APC board.

When the antenna impedance is mismatched, the base voltage of Q4 (R6 side on the VHF APC board) is higher than the other base voltage of Q4 (R4 side: reference voltage), resulting in a decrease in the collector current of Q4. This current controls the diode attenuator (VHF RF unit, D6) using Q5 until the base voltage of Q4 (R6 side) reaches the same level as that of Q4 (R4 side).

Low output power is obtained by changing the reference voltage via the VAP line. The voltage of the VAP line is controlled by two ports of the data expander (VHF RF unit, IC2). A thermistor (R3) controls APC reference voltage to reduce the output power when the temperature is increased. See Figure 3.

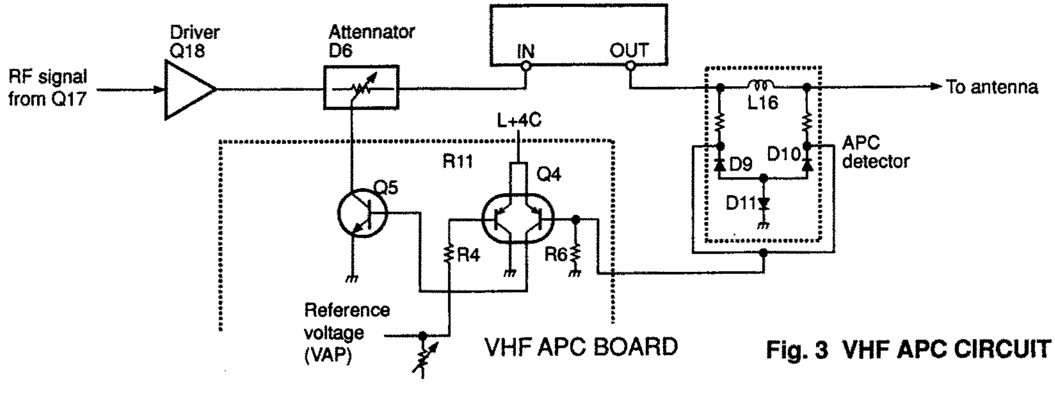


Fig. 3 VHF APC CIRCUIT

4-2-6 VHF ANTENNA SWITCHING CIRCUIT (VHF RF UNIT)

The antenna switching circuit applies receive signals to the receiver circuit and transmit signals to the antenna connector.

When transmitting, D12 and D16 are turned ON. The RF output signal is applied to the antenna connector via D12 and the low-pass filter (L8, L9, C42, C44, C46, C101, C102). At this time, D16 is also turned ON to activate the low-pass filter (L6, L7, C38–C40) as a resonator circuit.

4-2-7 UHF MODULATION CIRCUIT (UHF VCO BOARD AND UHF RF UNIT)

The audio signals from the microphone amplifier circuit (described in Section 4-2-1) are applied to D3 on the UHF VCO board.

The audio signals change the reactance of a varactor diode (D3) to modulate the oscillated signal at the UHF VCO circuit (Q1, Q2). The oscillated signal is amplified at the buffer amplifier (Q3, UHF RF unit Q13) and is then applied to the drive amplifier circuit (Q15, Q16) through the LO switch circuit (D11).

4-2-8 UHF POWER AMPLIFIER CIRCUIT (UHF RF UNIT)

IC5 is a power module which provides a stable 5 W (DC 13.5 V) of output power.

The drive amplifier (Q15, Q16) and power amplifier (IC5) amplify the VCO oscillating signal to an output level. The output signal passes through the APC detector circuit (D12–D14) and band-pass filter, and is applied to the antenna connector.

4-2-9 UHF APC CIRCUIT (UHF APC BOARD)

The APC circuit detects the output signal from the power module on the UHF RF unit. Q4 compares the voltages detected by the APC detector and the reference voltages. When a voltage detected by APC exceeds a reference voltage, Q4 increases D12 attenuation using Q5 to reduce the RF output power.

4-3 PLL CIRCUITS

4-3-1 GENERAL (VHF AND UHF RF UNITS)

A PLL circuit provides stable oscillation of the transmit frequency and the receive local frequency. The PLL circuit compares the phase of the divided VCO frequency to the reference frequency. The PLL output frequency is controlled by a crystal oscillator and the divided ratio of a programmable divider.

The PLL circuit, using a one chip PLL IC (VHF: IC3, UHF: IC4), directly generates the transmit frequency and receive 1st LO frequency with a VCO. The PLL IC sets the divided ratio based on serial data from the CPU on the LOGIC unit and compares the phases of a VCO signal and the reference oscillator frequency. The PLL IC detects the out-of-step phase and output from pins 15 and 16. The reference frequency (12.8 MHz) is oscillated at X3 on the UHF RF unit.

4-3-2 VHF PROGRAMMABLE DIVIDER AND PHASE DETECTOR CIRCUITS (VHF RF UNIT)

The VCO generated signal enters the PLL IC (IC3, pin 8) and is divided at the programmable divider section and is then applied to the phase detector section.

The phase detector compares the input signal and a reference frequency and outputs the out-of-phase signal (pulse-type signal) from pin 15 and 16.

4-3-3 VHF CHARGE PUMP AND LOOP FILTER CIRCUITS (VHF RF UNIT)

The phase detected signal is amplified at the charge pump (Q11, Q12). This signal is converted to DC voltage at the loop filter (R49–R51, C51–C54) and is applied to a varactor diode (D2) in the VHF VCO circuit to control and stabilize the oscillated frequency.

4-3-4 VHF VCO CIRCUIT (VHF VCO BOARD)

A VCO circuit generates receive and transmit frequencies at Q1, Q2, L2 and D2, and produces FM modulation.

The frequency shift signal from the data expander (IC2, pin 13) turns Q14 (VHF RF unit) and D1 (VHF VCO board) ON or OFF to switch the VCO frequency between transmitting and receiving.

4-3-5 REFERENCE OSCILLATOR CIRCUIT (UHF RF UNIT)

A 12.8 MHz reference frequency is generated by the oscillator (Q5, X3: UHF RF unit). The frequency is adjusted by C60. The reference frequency is applied to both the VHF and UHF PLL circuits.

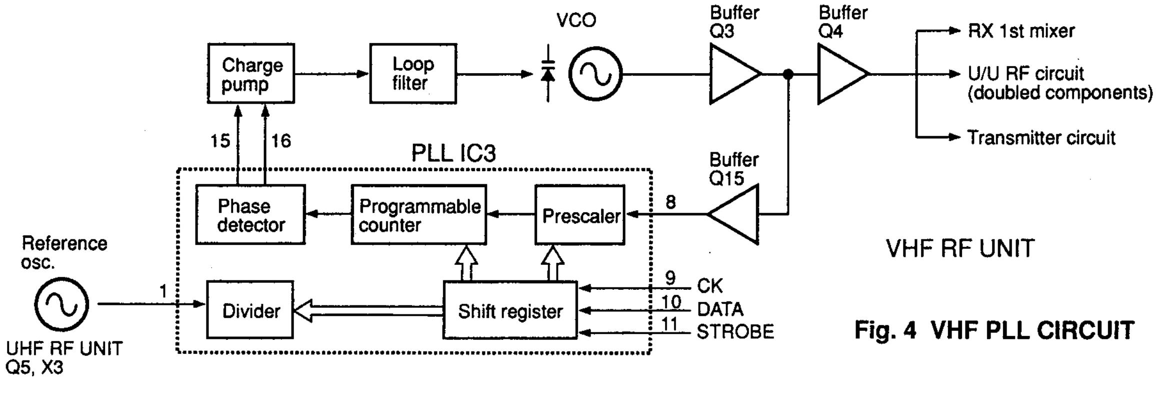


Fig. 4 VHF PLL CIRCUIT

4-3-6 UHF PLL CIRCUITS (UHF RF UNIT)

The VCO oscillated signal is buffer amplified at Q3 on the UHF VCO board, is amplified at Q11, and is then applied to the PLL IC (IC4, pin 8).

This signal is divided at the programmable divider section and is then applied to the phase detector section inside IC4. A reference frequency is also applied to IC4 from Q5, and the phase detector outputs the phase difference between the divided signal and the reference frequency via pin 15 and pin 16.

This out-of-phase signal is amplified at the charge pump (Q9, Q10) and is then converted to DC voltage by the loop filter (R38–R40, C69–C71).

The converted voltage is applied to a varactor diode (D1) of the VCO circuit on the UHF VCO board to control and stabilize the oscillated frequency.

4-4 OTHER CIRCUITS

4-4-1 TONE SQUELCH UNIT (U.S.A. version only: TSQL UNIT)

The TSQL UNIT provides pocket beep, tone squelch and programmable tone encoder functions.

ENCODER FUNCTION

The serial data from the CPU (IC1: LOGIC unit) is applied to IC1 (UHF) and IC2 (VHF). The tone signal reply to the data signal is output from IC1 (pin 16: UHF) or IC2 (pin 16: VHF) and is applied to the microphone amplifier (IC17a) through the modulation switch (IC18). R13 adjusts the deviation level.

DECODER FUNCTION

The received signal from the HDEF (LDEF) signal line is applied to the active low-pass filter Q6 (Q7) and then to pin 24 of IC1 (IC2). The filtered signal is compared with the programmed tone signal. Pin 13 of IC1 (IC2) becomes "LOW" when the received signal includes the same tone as the programmed tone frequency.

4-4-2 VOLTAGE LINES (VHF AND UHF RF UNITS)

VCC	This voltage is supplied from a battery pack or external DC power supply (DCJ board).
L M4C	VHF band common +4 V is produced at Q20, Q21 and D13 from the VCC using a +4 V reference voltage from the LOGIC unit (IC13). This 4 V is used for the charge pump and is controlled by the power save function (IC2, pin 19). This voltage provides quicker stand-up than L +4S when switching to transmit.
L R4S	VHF band receive 4 V is produced at Q24, Q25 and D14 using an LR4C voltage from the VHF DATA board (IC3). This voltage is used for the receiver circuit and is controlled by the PSC (power save control) and SEND lines.
L +4S	VHF band 4 V produced at Q26, Q27 and D15 using an L4SC voltage from the VHF DATA board (IC2). This voltage is used for the PLL circuit and is controlled by the PSC (power save control).
L T+4	VHF band transmit 4 V produced at Q1, Q2 and D1 on the VHF APC board using an LT4C from the VHF DATA board (IC4). This voltage is used for the transmitter circuit and is controlled by the inverted SEND and TMT (transmit mute) lines.
H M4C	UHF band common +4 V is produced at Q18, Q19 and D16 from the VCC using a +4 V reference voltage from the LOGIC unit (IC13). This 4 V is used for the charge pump and is controlled by the power save function (IC3, pin 19). This voltage provides quicker stand-up than H +4S when switching to transmit.
H R4S	UHF band receive 4 V is produced at Q22, Q23 and D18 using an HR4C voltage from the UHF DATA board (IC3). This voltage is used for the receiver circuit and is controlled by the PSC (power save control) and SEND line.
H +4S	UHF band 4 V produced at Q20, Q21 and D17 using an H4SC voltage from the UHF DATA board (IC2). This voltage is used for the PLL circuit and is controlled by the PSC (power save control).
H T+4	UHF band transmit 4 V produced at Q1, Q2 and D1 on the UHF APC board using an HT4C from the UHF DATA board (IC4). This voltage is used for the transmitter circuit and is controlled by the inverted SEND and TMT (transmit mute) lines.

4-5 PORT ALLOCATIONS

4-5-1 CPU (LOGIC UNIT)

1	AVCC	Power source input for A/D converter.
2	LSD	Input port for a VHF S-meter detection signal.
3	HSD	Input port for a UHF S-meter detection signal.
4	VIN	Input port for the CPU power source.
5	REMOTE	Input port for optional HM-75 remote control signal.
7	TEST	Not used.
8, 9	OSC1, 2	Clock oscillator terminals for a CPU clock.
10	RESET	CPU is initialized when this port receives "LOW."
11, 12	X1, X2	Clock oscillator terminals for clock/timer function.
14	LTSQLSTB	Outputs a strobe signal for a VHF tone squelch.
15	LIOSTB	Outputs a strobe signal to the VHF data expander IC (VHF RF unit, IC2).
16	LPLSTB	Outputs a strobe signal to the VHF PLL IC (VHF RF unit, IC3).
17	CLOCK	Outputs a serial clock signal for the VHF band's data expander and PLL IC.
18	DATA	Outputs serial data for the VHF band.
19	HTSQLSTB	Outputs a strobe signal for the UHF tone squelch.
20	HIOSTB	Outputs a strobe signal to the UHF data expander IC (UHF RF unit, IC3).
21	HPLSTB	Outputs a strobe signal to the UHF PLL IC (UHF RF unit, IC4).

22	HCK	Outputs a serial clock signal for the UHF band's data expander and PLL IC.
23	H DATA	Outputs serial data for the UHF band.
24	H BUSY	Input port for the UHF noise squelch condition. "HIGH": Squelch open. "LOW" : Squelch close.
25	FUNC	Input port for the [F] key. "LOW": [F] key pushed.
26	INT	CPU enters backup mode when this port receives "LOW."
27	BUSYLED	Outputs the receive LED signal.
28	PCON	Outputs the power save control signal.
29	PTT	Input port for the [PTT] switch.
30	POWER	Input port for the POWER switch. The transceiver starts operation when this port receives "HIGH" for 1sec.
31	TONE	Outputs a 1750 Hz tone call signal.
32	BEEP	Outputs a beep signal.
34–39	KR0–KR5	Input ports for the key matrix. Also used for DTMF data input.
40	IOSTB	Outputs a strobe signal to data expanders (LOGIC unit, IC2 and IC3).
41	LBUSY	Input port for the VHF noise squelch condition. "HIGH": Squelch open. "LOW" : Squelch close.
42–92	COM1, COM2, COM3, COM4	Used to drive LCD output.
94	V1	Input port for LCD driver power source.
97	VCC	Input port for the CPU power source.
98, 99	TONE C TONE R	Output DTMF row and column signals.
100	VTREF	Input port for DTMF encoder power source.

4-5-2 DATA EXPANDER (LOGIC UNIT, IC2)

8	CONT	Outputs LCD contrast signal.
9	TXLED	Outputs the transmit LED signal.
11	FDUP	Outputs the audio level switching signal for the whisper function.
12	LIGHT	Outputs the LCD backlight signal. "HIGH": lights.
13	AFON	Outputs the AF power amplifier control signal. "HIGH": AF amp activates. "LOW" : AF amp deactivates.
15	MICC	Outputs a microphone amplifier control signal.
16	MICM	Outputs a microphone mute signal. "HIGH": mic mute
17	H MONI	Outputs a UHF band's receive mute control signal.
18	L MONI	Outputs a VHF band's receive mute control signal.
19	HAFC	Outputs UHF band's separate speaker function signal. "HIGH": External speaker "LOW" : Internal speaker
20	LAFC	Outputs VHF band's separate speaker function signal. "HIGH": Internal speaker "LOW" : External speaker

4-5-3 DATA EXPANDER 2 (LOGIC UNIT, IC3)

8	INSEL	Outputs a DTMF audio selector signal. "HIGH": UHF band "LOW" : VHF band
9	TOE	Outputs an enable signal for the DTMF decoder IC4.
11	PD	Outputs a DTMF encoder power control signal.
12	H MUTE	Outputs a UHF band remote control signal. "HIGH": Remote control ON "LOW" : Remote control OFF
13	L MUTE	Outputs a VHF band remote control signal.
14, 15	I0, I1	Output an initial matrix signal.
16–20	S0, K0–K3	Output key matrix signal.

4-5-4 DATA EXPANDER 3 (VHF RF UNIT, IC2)

8, 9	VAP	Output transmit power (low1–low3) selector signals.
11	HIGH	Outputs transmit power (high or low) selector signal.
12	ELOW	Outputs transmit power (ELOW) selector signal.
13	SHIFT	Outputs VCO shift signal for transmit frequency.
15	U/U	Outputs U/U function control signal. "LOW" : Function ON.
16	SEND	Outputs an inverted send signal. "HIGH": transmit
17	TMT	Outputs transmit mute signal. "LOW" : transmit mute
18	SEND	Outputs transmit control signal. "LOW" : transmit
19	PSC	Outputs power save control signal.

4-5-5 DATA EXPANDER 4 (UHF RF UNIT, IC3)

8, 9	USC	Output transmit power (low1–low3) selector signal.
11	HIGH	Outputs transmit power (high or low) selector signal.
12	ELOW	Outputs transmit power (ELOW) selector signal.
13	SHIFT	Outputs VCO shift signal for transmit frequency.
16	SEND	Outputs an inverted send signal. "HIGH": transmit
17	TMT	Outputs transmit mute signal. "LOW" : transmit mute
18	SEND	Outputs transmit control signal. "LOW" : transmit
19	PSC	Outputs power save control signal.

SECTION 5 ADJUSTMENT PROCEDURES

5-1 PREPARATION BEFORE SERVICING

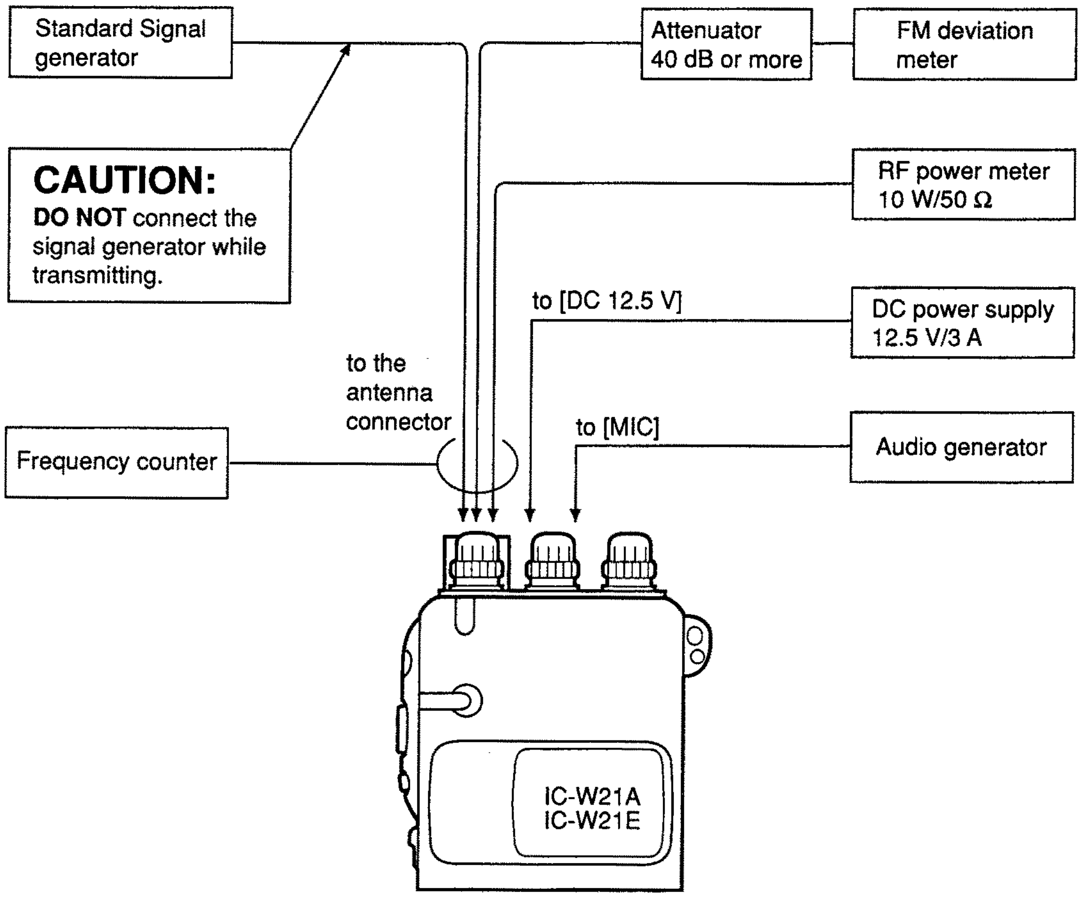
■REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	
DC power supply	Output voltage	: 12.5 V DC 13.5 V DC (Only adjusting output power)
	Current capacity	: 3 A or more
RF power meter (terminated type)	Measuring range	: 1–10 W
	Frequency range	: 0.1–500 MHz
	Input impedance	: 50 Ω
	SWR	: 1.2 : 1 or better
Frequency counter	Frequency range	: 0.1–470 MHz
	Frequency accuracy	: ± 1 ppm or better
	Sensitivity	: 100 mV or better
Oscilloscope	Frequency range	: DC–20 MHz
	Output range	: 0.01–10 V

EQUIPMENT	GRADE AND RANGE	
Standard signal generator (SSG)	Frequency range	: 0.1–470 MHz
	Output level	: –127 to –17 dBm (0.1 μV to 32 mV)
DC voltmeter	Input impedance	: 50 kΩ/V DC or better
Audio generator (AG)	Frequency range	: 300–3000 Hz
	Measuring range	: 1–500 mV
Attenuator	Attenuation	: 40 dB or more
	Capacity	: 10 W or more
FM deviation meter	Frequency minimum	: 470 MHz
	Measuring range	: 0 to ±10 kHz

CW: Clockwise
CCW: Counterclockwise

■CONNECTIONS


Standard Signal generator
Attenuator 40 dB or more
FM deviation meter
RF power meter 10 W/50 Ω
to [DC 12.5 V]
DC power supply 12.5 V/3 A
to the antenna connector
to [MIC]
Audio generator
Frequency counter
IC-W21A
IC-W21E

CAUTION:
DO NOT connect the signal generator while transmitting.

5-2 PLL ADJUSTMENT

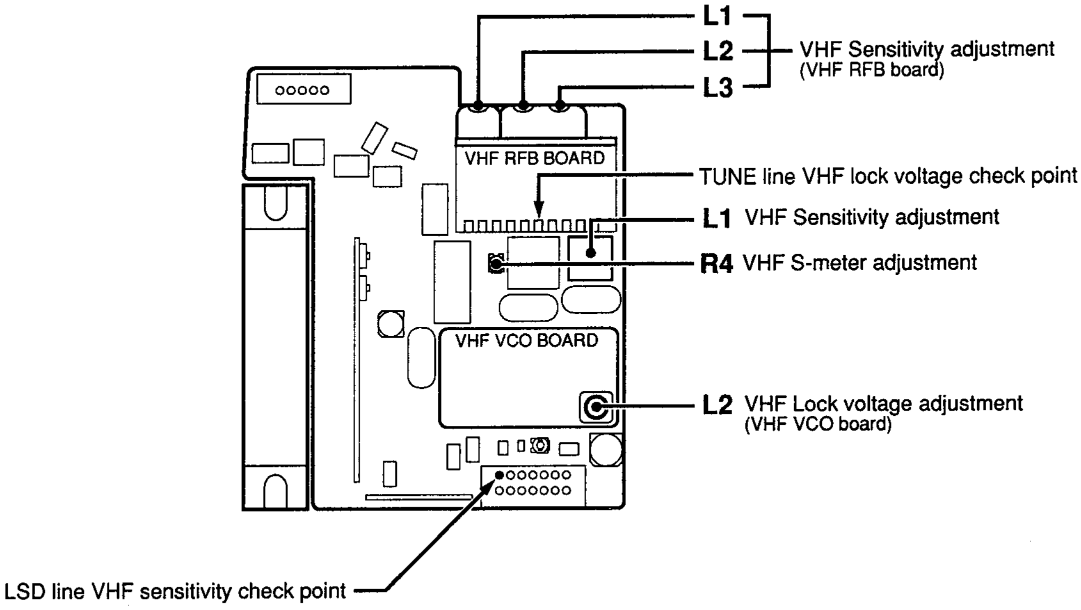
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF LOCK VOLTAGE	1	• Displayed frequency: 145.000 MHz • Adjust either the transmit lock voltage or receive lock voltage (whichever is higher).	VHF RFA	Connect the DC voltmeter to the TUNE line.	1.9 V	VHF VCO	L2
	2				1.4 V ± 0.4 V after a foil is attached.		Verify
UHF LOCK VOLTAGE	1	• Displayed frequency: 450.000 MHz (USA) 440.000 MHz (All other versions) • Adjust either the transmit lock voltage or receive lock voltage (whichever is higher).	UHF RF	Connect the DC voltmeter to the LV.	2.9 V	UHF VCO	C6
REFERENCE FREQUENCY	1	• Displayed frequency: 440.000 MHz • Transmitting	Top panel	Loosely couple the frequency counter to the antenna connector.	440.000 MHz	UHF RF	C60

5-3 RECEIVER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF SENSITIVITY	1	• Displayed frequency: 145.000 MHz • Connect the SSG to the antenna connector and set as: Level : 1.0 µV* (–107 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • [VHF SQL] control : CCW • Receiving	VHF RF	Connect the oscilloscope to the LSD line of J1.	Maximum DC voltage	VHF RFB VHF RF	Adjust in sequence L1, L2, L3 L1
VHF S-METER	1	• Displayed frequency: 145.000 MHz • Connect the SSG to the antenna connector and set as: Level : 0.5 µV (–113 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	LCD display	S/RF indicator	S3 (3 dots)	VHF RF	R4
UHF SENSITIVITY	1	• Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) • Connect the SSG to the antenna connector and set as: Level : 1.0 µV (–107 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • [UHF SQL] control : CCW • Receiving	UHF RF	Connect the oscilloscope to the HSD line of J1.	Maximum DC voltage	UHF RFB	L1: input L2: output
	2	• Displayed frequency: 440.500 MHz (USA) 430.500 MHz (All other versions)					L1: output L2: input
UHF S-METER	1	• Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) • Connect the SSG to the antenna connector and set as: Level : 0.5 µV (–113 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	LCD display	S/RF indicator	S3 (3 dots)	UHF RF	R4

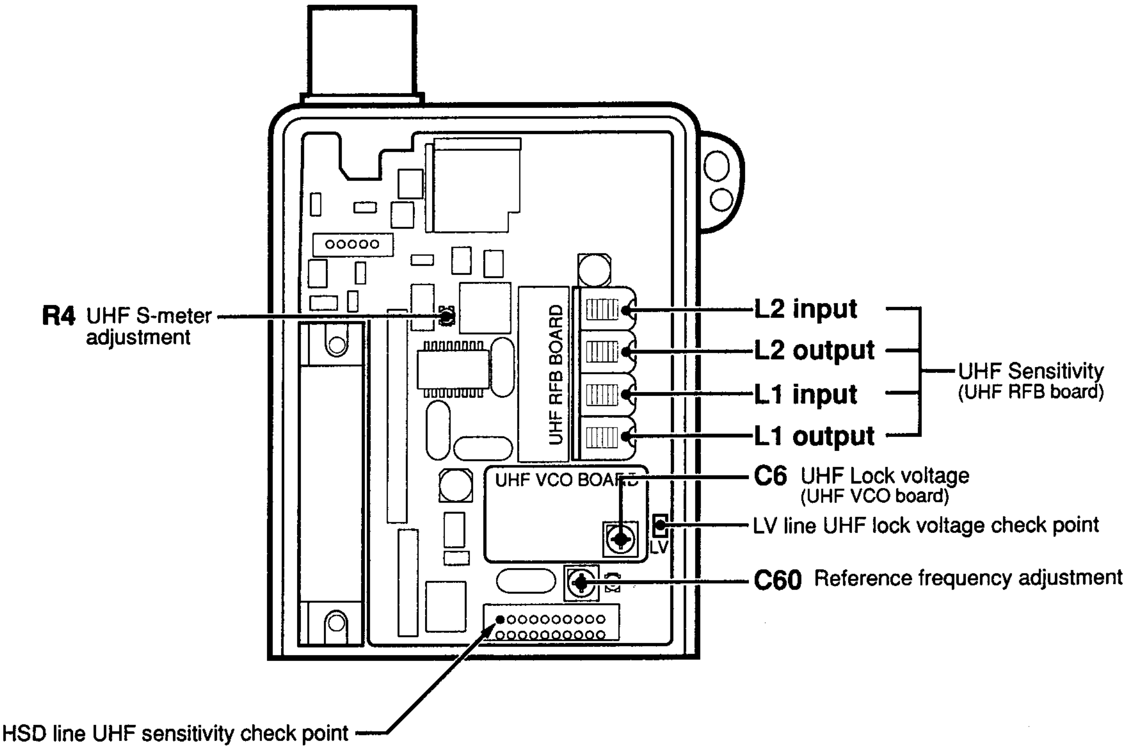
* This output level of the standard signal generator (SSG) is indicated as the SSG's open circuit.

- **VHF RF UNIT**



L1
L2
L3
VHF Sensitivity adjustment
(VHF RFB board)
VHF RFB BOARD
TUNE line VHF lock voltage check point
L1 VHF Sensitivity adjustment
R4 VHF S-meter adjustment
VHF VCO BOARD
L2 VHF Lock voltage adjustment
(VHF VCO board)
LSD line VHF sensitivity check point

- **UHF RF UNIT**

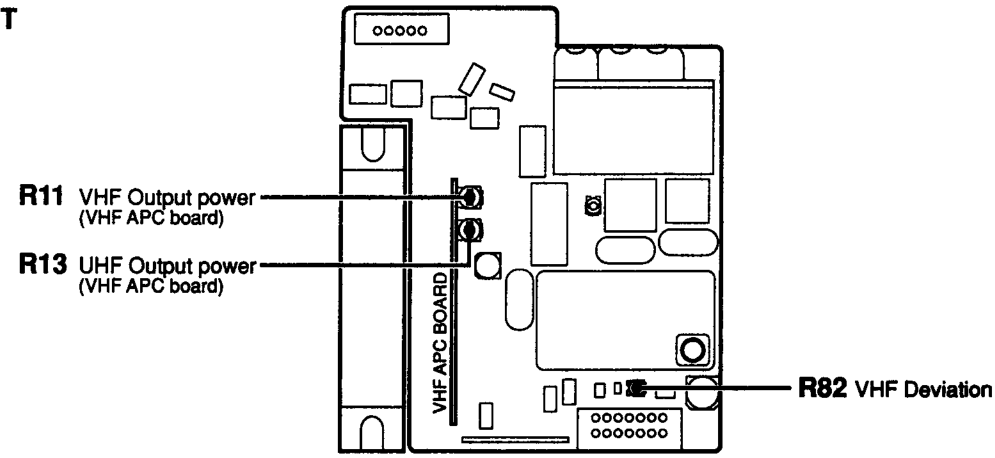


R4 UHF S-meter adjustment
UHF RFB BOARD
L2 input
L2 output
L1 input
L1 output
UHF Sensitivity
(UHF RFB board)
UHF VCO BOARD
C6 UHF Lock voltage
(UHF VCO board)
LV
LV line UHF lock voltage check point
C60 Reference frequency adjustment
HSD line UHF sensitivity check point

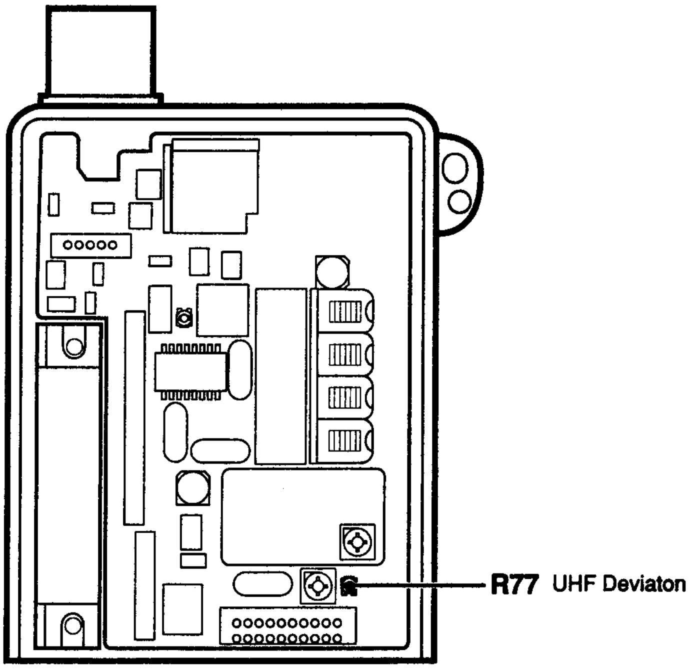
5-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF OUTPUT POWER	1	• Displayed frequency 145.000 MHz • Output power : High • Transmitting • Be sure the power supply voltage is 13.5 V	Top panel	Connect the RF power meter to the antenna connector.	5.0 W	VHF APC	R11
VHF DEVIATION	1	• Displayed frequency: 145.000 MHz • Connect the audio generator to the [MIC] connector and set as: 190 mV/1.0 kHz (USA) 95 mV/1.0 kHz (All other versions) • Set the FM deviation meter as: HPF : 50 Hz LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±4.8 kHz	VHF RF	R82
UHF OUTPUT POWER	1	• Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) • Output power : High • Transmitting • Be sure the power supply voltage is 13.5 V	Top panel	Connect the RF power meter to the antenna connector.	5.0 W	VHF APC	R13
UHF DEVIATION	1	• Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) • Connect the audio generator to the [MIC] connector and set as: 190 mV/1.0 kHz (USA) 95 mV/1.0 kHz (All other versions) • Set the FM deviation meter as: HPF : 50 Hz LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±4.8 kHz	UHF RF	R77
DTMF DEVIATION	1	• Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) • While pushing [F], [MONI] and [LIGHT] keys, turn power ON. • Push [RPT] key while transmitting.	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±3.5 kHz	LOGIC	R21
TONE CALL DEVIATION (IC-W21E only)	1	• Displayed frequency: 435.000 MHz • Push and hold [RPT] key while transmitting.	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±3.5 kHz	LOGIC	R33
TONE SQL DEVIATION (USA only)	1	• Displayed frequency : 445.000 MHz (USA) • Tone frequency : 88.5 Hz • Tone encoder : ON • Transmitting • Apply no signal to the [MIC] connector.	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±0.75 kHz	TSQL	R13

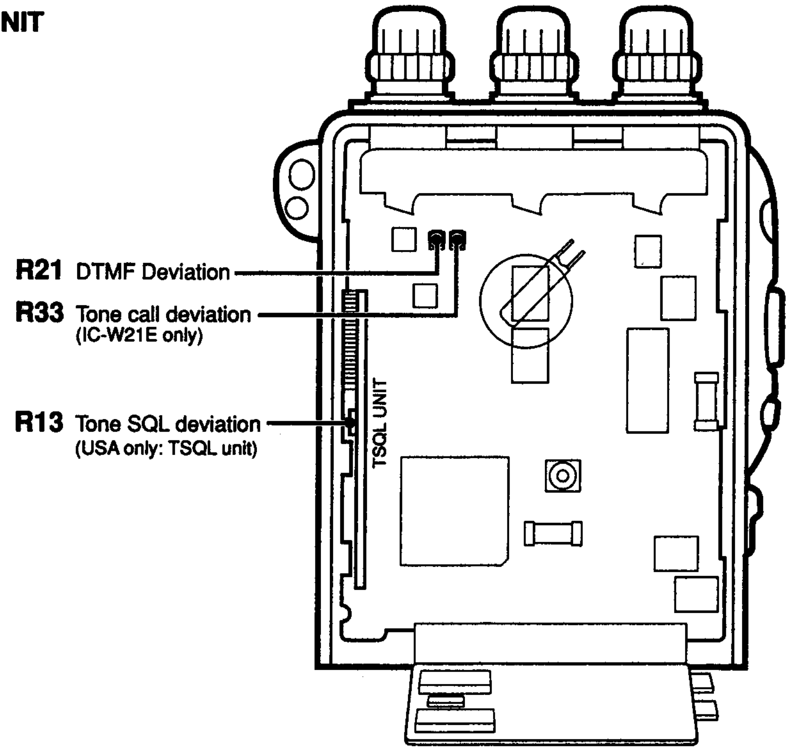
• VHF RF UNIT


R11 VHF Output power
(VHF APC board)
R13 UHF Output power
(VHF APC board)
VHF APC BOARD
R82 VHF Deviation

• UHF RF UNIT


R77 UHF Deviaton

• LOGIC UNIT


R21 DTMF Deviation
R33 Tone call deviation
(IC-W21E only)
R13 Tone SQL deviation
(USA only: TSQL unit)
TSQL UNIT

SECTION 6 PARTS LIST

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1140003590	S.IC	HD404629A59H
IC2	1150001100	S.IC	M66321GP-30AD
IC3	1150001100	S.IC	M66321GP-30AD
IC4	1130004330	S.IC	LC7385M
IC5	1130006220	S.IC	TC4W53FU (TE12L)
IC6	1130006540	S.IC	TC7S02FU (TE85R)
IC7	1110002400	S.IC	NJM2107F(TE1)
IC8	1130006220	S.IC	TC4W53FU (TE12L)
IC9	1130006540	S.IC	TC7S02FU (TE85R)
IC10	1110002400	S.IC	NJM2107F(TE1)
IC11	1130006220	S.IC	TC4W53FU (TE12L)
IC12	1130006550	S.IC	TC7S08FU (TE85R)
IC13	1180001000	S.IC	S-81240PG-PJ-T1
IC14	1130006550	S.IC	TC7S08FU (TE85R)
IC15	1180001020	S.IC	S-80735AL-AZ-T1
IC17	1110002490	S.IC	M5218FP-73A
IC18	1130006220	S.IC	TC4W53FU (TE12L)
IC19	1130006220	S.IC	TC4W53FU (TE12L)
IC20	1130006890	S.IC	TC7S04FU (TE85R)
IC21	1130006220	S.IC	TC4W53FU (TE12L)
IC22	1130006220	S.IC	TC4W53FU (TE12L)
IC23	1130007020	S.IC	TC7S66FU(TE85R)
IC24	1130007030	S.IC	TC7W08FU(TE12L)
Q1	1590001170	S.TRANSISTOR	XP1501-(TX).AB
Q2	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q3	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q4	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q6	1590001170	S.TRANSISTOR	XP1501-(TX).AB
Q7	1590001130	S.TRANSISTOR	UN9110(TX)
Q8	1590001150	S.TRANSISTOR	UN9211(TX)
Q10	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q11	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q12	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q13	1590001170	S.TRANSISTOR	XP1501-(TX).AB
Q14	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q15	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q16	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q17	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q18	1590001170	S.TRANSISTOR	XP1501-(TX).AB
Q19	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q20	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q21	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q22	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q23	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q25	1590001140	S.TRANSISTOR	UN9210(TX)
Q26	1590001180	S.TRANSISTOR	XP1210(TX)
Q27	1590001140	S.TRANSISTOR	UN9210(TX)
Q28	1590001180	S.TRANSISTOR	XP1210(TX)
Q29	1590001140	S.TRANSISTOR	UN9210(TX)
Q30	1590001140	S.TRANSISTOR	UN9210(TX)
Q31	1590001470	S.TRANSISTOR	UN9213(TX)
D1	1750000340	S.DIODE	1SS357 (TPHR3)
D2	1750000340	S.DIODE	1SS357 (TPHR3)
D3	1750000340	S.DIODE	1SS357 (TPHR3)
D4	1790000590	S.DIODE	MA110(TW)
D6	1750000130	S.DIODE	DA204U T107
D7	1790000490	S.DIODE	HSM88AS-TR
D8	1750000130	S.DIODE	DA204U T107
D9	1750000130	S.DIODE	DA204U T107
D10	1750000130	S.DIODE	DA204U T107

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
D11	1750000130	S.DIODE	DA204U T107
D12	1790000490	S.DIODE	HSM88AS-TR
D13	1750000130	S.DIODE	DA204U T107
D14	1750000130	S.DIODE	DA204U T107
D15	1750000130	S.DIODE	DA204U T107
D17	1790000870	S.DIODE	MA1S121(TX)
D18	1790000870	S.DIODE	MA1S121(TX)
D19	1790000870	S.DIODE	MA1S121(TX)
D20	1790000870	S.DIODE	MA1S121(TX)
D21	1790000870	S.DIODE	MA1S121(TX)
D22	1790000820	S.DIODE	MA132K(TX) (EUR, UK, USA, AUS, SEA)
D23	1790000850	S.DIODE	MA132WK(TX) (ITA)
D24	1790000820	S.DIODE	MA132K(TX) (UK, AUS)
	1790000830	S.DIODE	MA132HK(TX) (EUR, USA)
	1790000850	S.DIODE	MA132WK(TX) (SEA)
D25	1790000830	S.DIODE	MA132HK(TX) (ITA, USA, AUS, SEA)
D26	1750000130	S.DIODE	DA204U T107
X1	6060000520	S.CERAMIC	CSAC2.00MGC200-TC
X2	6050005801	XTAL	DS-VT200 (32.768 kHz ± 20)
X3	6060000150	S.CERAMIC	CSAC3.58MGC300CD
R1	7410000610	S.ARRAY	EXB-V4V 153JV (15 kΩ)
R2	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R4	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R5	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R6	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R7	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R8	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R9	7410000560	S.ARRAY	EXB-V4V 474JV (470 kΩ)
R13	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R14	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R16	7030003770	S.RESISTOR	ERJ3GEYJ 564 V (560 kΩ)
R17	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R18	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R19	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R21	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R22	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R23	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R24	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R25	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R26	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R27	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R28	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R29	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R30	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R31	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R32	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R33	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R38	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R39	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R40	7410000560	S.ARRAY	EXB-V4V 474JV (470 kΩ)
R41	7410000580	S.ARRAY	EXB-V4V 224JV (220 kΩ)
R42	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R43	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R44	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R45	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 kΩ)
R46	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω) (EUR, ITA, UK, AUS, SEA)
	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω) (USA)

S. = Surface mount

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R47	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ) (EUR, ITA, UK)
R48	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R49	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R50	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R51	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R52	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R53	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R54	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R55	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R56	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R58	7410000560	S.ARRAY	EXB-V4V 474JV (470 kΩ) (EUR, ITA, UK)
R60	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R61	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R62	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R63	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R64	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R65	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 kΩ)
R66	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R67	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 kΩ)
R68	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R69	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R70	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R71	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R72	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R73	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R74	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R75	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R76	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R77	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R78	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R79	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R80	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R81	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R82	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R83	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R84	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R85	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R86	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R87	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R88	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R89	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R90	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R91	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R92	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 kΩ)
R93	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R94	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 kΩ)
R95	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R96	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R97	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R98	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R99	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R100	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R101	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R102	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R103	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R104	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R105	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R106	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R107	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R108	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R109	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R110	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R111	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R112	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R113	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R114	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R115	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R116	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R117	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R118	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R119	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R120	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R122	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R123	7410000560	S.ARRAY	EXB-V4V 474JV (470 kΩ)
R124	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R125	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R127	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R128	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R129	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R130	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R131	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R132	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R133	7410000590	S.ARRAY	EXB-V4V 473JV (47 kΩ)
R134	7410000720	S.ARRAY	EXB-V8V 473JV (47 kΩ)
R135	7410000560	S.ARRAY	EXB-V4V 474JV (470 kΩ)
R137	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R138	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R139	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R140	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R141	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R144	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R145	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R146	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R148	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R149	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R150	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R151	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
C1	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C7	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C8	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C9	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C10	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C11	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C12	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C14	4550006020	S.TANTALUM	TEMSVB2 0G 226M-8L
C15	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C16	4550003020	S.TANTALUM	TEMSVD2 0G 107M-12L
C17	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4550003160	S.TANTALUM	TEMSVD2 1C 336M-12L
C19	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C20	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C21	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C24	4550002720	S.TANTALUM	TESVD2 0J 476M-12L
C25	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C26	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C27	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C28	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C29	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C30	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C31	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C32	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C33	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C34	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C35	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C36	4030008960 4030009000	S.CERAMIC S.CERAMIC	C2012 JB 1C 104K-T-A (USA) C2012 JB 1C 224K-T-A (EUR, ITA, UK, AUS, SEA)
C37	4030008470	S.CERAMIC	C1608 JB 1H 272K-T-A
C38	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C39	4030007140	S.CERAMIC	C1608 CH 1H 121J-T-A
C40	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C41	4550004700	S.TANTALUM	F95 1V474MQAAQ2
C44	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C45	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C51	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A

S. = Surface mount

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C52	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C53	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C54	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C55	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C56	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C57	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C58	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C59	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C60	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C61	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C62	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C63	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C64	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C65	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C66	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C67	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C68	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C69	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C70	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C71	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C74	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C75	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C76	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C77	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C78	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C79	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C80	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C81	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C82	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C83	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C84	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C85	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C88	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C89	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C90	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C91	4550004060	S.TANTALUM	F95 0J106MSAAQ2
C93	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C94	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C95	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C98	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C99	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
DS1	5030000890	LCD	LD-BU5545J
DS2	5040001110	S.LED	SLM-23VMWS T97B
DS3	5040001260	LED	LN01301C(Q)
DS4	5040001260	LED	LN01301C(Q)
DS5	5040001260	LED	LN01301C(Q)
DS6	5040001260	LED	LN01301C(Q)
SP1	2510000580	SPEAKER	EAS-2P104D
BT1	3020000220	LITHIUM BATTERY	VL1220-1VC
EP1	910037135	PCB	B 3657E

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1120001650	S.IC	TK10487MTR
IC2	1150001100	S.IC	M66321GP-30AD
IC3	1140002210	S.IC	MB1504HPF-G-BND
IC4	1150000960	IC	M67748L / SC1142
Q1	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q2	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q3	1590001180	S.TRANSISTOR	XP1210(TX)
Q4	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q5	1560000550	S.FET	2SK882-Y (TE85R)
Q6	1590000650	S.TRANSISTOR	DTA144TU T107
Q7	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q8	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q9	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q10	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q11	1510000830	S.TRANSISTOR	2SA1587-GR (TE85R)
Q12	1530003010	S.TRANSISTOR	2SC4117-GR (TE85R)
Q13	1560000540	S.FET	2SK880-Y (TE85R)
Q14	1590000680	S.TRANSISTOR	DTC114EU T107
Q15	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q16	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q17	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q18	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q19	1590001690	S.TRANSISTOR	UN9115(TX)
Q20	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q21	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q22	1590000430	S.TRANSISTOR	DTC144EU T107
Q23	1590000440	S.TRANSISTOR	DTA143ZU T107
Q24	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q25	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q26	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q27	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q28	1590000720	S.TRANSISTOR	DTA144EU T107
Q29	1590000430	S.TRANSISTOR	DTC144EU T107
Q30	1590000650	S.TRANSISTOR	DTA144TU T107
Q31	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q32	1590000680	S.TRANSISTOR	DTC114EU T107
Q33	1590001150	S.TRANSISTOR	UN9211(TX)
D1	1790000620	S.DIODE	MA77(TW)
D2	1790000620	S.DIODE	MA77(TW)
D3	1790000620	S.DIODE	MA77(TW)
D4	1790000620	S.DIODE	MA77(TW)
D5	1790000620	S.DIODE	MA77(TW)
D6	1720000240	S.DIODE	1SV172 (TE85R)
D7	1790000620	S.DIODE	MA77(TW)
D8	1790000620	S.DIODE	MA77(TW)
D9	1720000360	S.DIODE	HSU88TRF
D10	1720000360	S.DIODE	HSU88TRF
D11	1790000590	S.DIODE	MA110(TW)
D12	1790000450	S.DIODE	MA862(TX)
D13	1790000590	S.DIODE	MA110(TW)
D14	1790000590	S.DIODE	MA110(TW)
D15	1790000590	S.DIODE	MA110(TW)
D16	1790000450	S.DIODE	MA862(TX)
X1	6070000060	DISCRIMINATOR	CDBM455C7
X2	6050008400	XTAL	CR-419 42.645 MHz
FI1	2020000550	CERAMIC	CFUM455E
FI2	2010001530	MONOLITH	FL-189 43.100 MHz
L1	6150004060	COIL	LS-467
L2	6200001650	S.COIL	ELJNC 18NK-F
L3	6200001650	S.COIL	ELJNC 18NK-F
L4	6110001990	COIL	LA-223

S. = Surface mount

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
L5	6110002110	COIL	LA-382
L6	6110002000	COIL	LA-226
L7	6110001550	COIL	LA-235
L8	6110002150	COIL	LA-385
L9	6110001550	COIL	LA-235
L12	6200001120	S.COIL	MLF2012D R12M-T
L13	6200001120	S.COIL	MLF2012D R12M-T
L14	6200002160	S.COIL	ELJNC 82NK-F
L15	6200001060	S.COIL	MLF2012D 47NM-T
L16	6200001770	S.COIL	ELJNC 47NK-F
L17	6200001520	S.COIL	MLF2012D R82K-T
R1	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R2	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R4	7310003720	S.TRIMMER	EVM-1XSX50 B23 (202)
R5	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R7	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R8	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R9	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R10	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R11	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R12	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R13	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R14	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R15	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R16	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R17	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R18	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R19	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R20	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R22	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R23	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R24	7030003290	S.RESISTOR	ERJ3GEYJ 560 V (56 Ω)
R25	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R26	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R27	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R28	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R29	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R30	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R31	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R32	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R33	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R34	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R35	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R36	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R38	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R39	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R40	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R41	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R44	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R45	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R46	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R47	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R48	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R49	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R50	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R51	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R52	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R53	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R54	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R55	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R56	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R57	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R58	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R59	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R61	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R62	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R63	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R64	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R65	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R66	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R67	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R68	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R69	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R70	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R71	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R72	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R73	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R74	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R75	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R76	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R77	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R78	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R79	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R80	7510000180	S.THERMISTOR	DTN-T203S223LS(T)
R81	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R82	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R83	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R84	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R85	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R86	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R87	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R88	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R89	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R90	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R91	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R92	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
C1	4030007120	S.CERAMIC	C1608 CH 1H 820J-T-A
C2	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C3	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C4	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C5	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C6	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C7	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C8	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C11	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C12	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C13	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C14	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C15	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C16	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C17	4550006010	S.TANTALUM	TEMSVA 0G 106M8L
C18	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C19	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C20	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C21	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C24	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C25	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C26	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C27	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C28	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C29	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C30	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C31	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C32	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C33	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C34	4030006950	S.CERAMIC	C1608 CH 1H 040C-T-A
C35	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C36	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C37	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C38	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C39	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C40	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C41	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C42	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C44	4030008560	S.CERAMIC	C1608 CH 1H 300J-T-A

S. = Surface mount

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C46	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C47	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C48	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
C49	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C50	4550004440	S.TANTALUM	F95 0J335MQAAQ2
C51	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C52	4550004090	S.TANTALUM	F95 1A475MRAAQ2
C53	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C54	4550000530	S.TANTALUM	TESVA 1V 104M1-8L
C55	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C56	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C57	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C58	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C59	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C61	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C62	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C63	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C64	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C65	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C66	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C67	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C68	4510005600	S.ELECTROLYTIC	ECEV1CAS100R
C70	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C74	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C75	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C76	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C77	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C78	4510004430	S.ELECTROLYTIC	ECEV1CV220WR
C79	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C80	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C81	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C82	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C83	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C84	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C85	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C88	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C89	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C90	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C91	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C92	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4550000550	S.TANTALUM	TESVA 1V 224M1-8L
C94	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C95	4550000550	S.TANTALUM	TESVA 1V 224M1-8L
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4550000550	S.TANTALUM	TESVA 1V 224M1-8L
C98	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C99	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C101	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C102	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C103	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C105	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C106	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C107	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C108	4550004500	S.TANTALUM	F95 1D105MQAAQ2
C109	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C110	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C111	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C112	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	910035807	PCB	B 3590G

[VHF RFA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q2	1530002570	S.TRANSISTOR	2SC4405-3-TR
D1	1790000620	S.DIODE	MA77(TW)
D2	1720000370	S.VARICAP	HVU350TRF
D3	1790000620	S.DIODE	MA77(TW)
D4	1720000370	S.VARICAP	HVU350TRF
D5	1720000370	S.VARICAP	HVU350TRF
D6	1790000620	S.DIODE	MA77(TW)
R1	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R2	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R4	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R5	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R6	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R7	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R8	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R9	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R10	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R11	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R14	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
C1	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C2	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C3	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C4	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C7	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C9	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C12	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C13	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C21	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	910037750	PCB	B 3710
EP3	6510008580	LEADFRAME	PT2.0-0.7-16.5 (K)

[VHF RFB BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
L1	6150003120	COIL	LS-321
L2	6130002680	COIL	LB-299
L3	6130002690	COIL	LB-300
EP1	910037620	PCB	B 3717

S. = Surface mount

[VHF APC BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q2	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q3	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q4	1590000620	S.TRANSISTOR	FMS1 T148
Q5	1540000410	S.TRANSISTOR	2SD2345(TX)S
D1	1790000590	S.DIODE	MA110(TW)
D2	1790000850	S.DIODE	MA132WK(TX)
R1	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R2	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R3	7510000200	S.THERMISTOR	DTN-T203U473LS(T)
R4	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R5	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R6	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R7	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R8	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R11	7310003520	S.TRIMMER	RV-224(RH03AVA15)104
R12	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R13	7310003520	S.TRIMMER	RV-224(RH03AVA15)104
R14	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
C1	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C4	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4510005600	S.ELECTROLYTIC	ECEV1CAS100R
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	910037731	PCB	B 3708A
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[VHF VCO BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q2	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q3	1530002560	S.TRANSISTOR	2SC4403-3-TR
D1	1790000620	S.DIODE	MA77(TW)
D2	1720000370	S.VARICAP	HVU350TRF
L1	6200001520	S.COIL	MLF2012D R82K-T
L2	6130002660	S.COIL	LB-287
L3	6200001630	S.COIL	ELJNC R10K-F
R1	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R2	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R3	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R4	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R5	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R6	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R7	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R8	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R9	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R10	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)

[VHF VCO BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
R11	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R12	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R13	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R14	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R15	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
C1	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C7	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C8	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C12	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C13	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
EP1	910035242	PCB	B 3522B

[VHF DATA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130004170	S.IC	TC4S01F (TE85R)
IC2	1130003760	S.IC	TC4S81F (TE85R)
IC3	1130003760	S.IC	TC4S81F (TE85R)
IC4	1130003760	S.IC	TC4S81F (TE85R)
R1	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R2	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R3	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
EP1	910037771	PCB	B 3735A
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110002780	S.IC	MC3371DR
IC2	1110003080	S.IC	µPC2715T-E3
IC3	1150001100	S.IC	M66321GP-30AD
IC4	1140002210	S.IC	MB1504HPF-G-BND
IC5	1150000970	IC	M67749M / SC1143
IC6	1110003080	S.IC	µPC2715T-E3
IC7	1110003080	S.IC	µPC2715T-E3
IC8	1130007020	S.IC	TC7S66FU(TE85R)
Q1	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q2	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q3	1590000740	S.TRANSISTOR	FMA4 T148
Q4	1590001060	S.TRANSISTOR	DTA114TU T107
Q5	1530003010	S.TRANSISTOR	2SC4117-GR (TE85R)
Q6	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q7	1590000440	S.TRANSISTOR	DTA143ZU T107

S. = Surface mount

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
Q8	1590000430	S.TRANSISTOR	DTC144EU T107
Q9	1510000820	S.TRANSISTOR	2SA1587-BL (TE85R)
Q10	1530003010	S.TRANSISTOR	2SC4117-GR (TE85R)
Q11	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q12	1590000430	S.TRANSISTOR	DTC144EU T107
Q13	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q14	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q15	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q16	1530000371	S.TRANSISTOR	2SC3356 R25-T2B
Q17	1590001690	S.TRANSISTOR	UN9115(TX)
Q18	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q19	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q20	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q21	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q22	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q23	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q25	1590000680	S.TRANSISTOR	DTC114EU T107
Q30	1590001150	S.TRANSISTOR	UN9211(TX)
D1	1160000060	S.DIODE	DAN202U T107
D5	1790000620	S.DIODE	MA77(TW)
D6	1790000620	S.DIODE	MA77(TW)
D8	1790000620	S.DIODE	MA77(TW)
D9	1790000620	S.DIODE	MA77(TW)
D11	1790000620	S.DIODE	MA77(TW)
D12	1720000360	S.DIODE	HSU88TRF
D13	1720000360	S.DIODE	HSU88TRF
D14	1790000590	S.DIODE	MA110(TW)
D15	1790000450	S.DIODE	MA862(TX)
D16	1790000590	S.DIODE	MA110(TW)
D17	1790000590	S.DIODE	MA110(TW)
D18	1750000160	S.DIODE	DA114 T107
D19	1790000620	S.DIODE	MA77(TW)
D20	1790000620	S.DIODE	MA77(TW)
D21	1720000240	S.DIODE	1SV172 (TE85R)
D22	1790000620	S.DIODE	MA77(TW)
D23	1790001030	S.DIODE	SB30-03P-TD
D24	1790000620	S.DIODE	MA77(TW)
X1	6070000100	DISCRIMINATOR	CDBM455C18
X2	6050008390	XTAL	CR-425 UM-5 35.345106 MHz
X3	6050007230	XTAL	CR-329 UM-1/T 12.80000 MHz
FI1	2020000550	CERAMIC	CFUM455E
FI2	2010001520	FILTER	FL-191 UM-53P 35M15B5
L1	6200002240	S.COIL	ELJFC 2R2K-F
L2	6200002440	S.COIL	LL2012-F10NK
L3	6200002230	S.COIL	LL2012-F22NK
L4	6200002230	S.COIL	LL2012-F22NK
L5	6110001990	COIL	LA-223
L6	6110001990	COIL	LA-223
L7	6200002230	S.COIL	LL2012-F22NK
L8	6110001980	COIL	LA-222
L9	6110002010	COIL	LA-224
L10	6110002130	COIL	LA-383
L11	6110001990	COIL	LA-223
L12	6110001990	COIL	LA-223
L13	6200000720	S.COIL	LQN 2A 10NM
L14	6200000720	S.COIL	LQN 2A 10NM
L16	6110002000	COIL	LA-226
L17	6110002070	COIL	LA-227
L18	6200001510	S.COIL	MLF2012D R10K-T
L20	6200002230	S.COIL	LL2012-F22NK
L22	6200002460	S.COIL	LL2012-F18NK
L23	6200002230	S.COIL	LL2012-F22NK
L24	6200002230	S.COIL	LL2012-F22NK

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
L25	6200002470	S.COIL	ELJNC 12NK-F
L26	6200001520	S.COIL	MLF2012D R82K-T
L27	6200002150	S.COIL	ELJNC 56NK-F
R1	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R2	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R3	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R4	7310003720	S.TRIMMER	EVM-1XSX50 B23 (202)
R5	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R6	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R7	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R8	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R9	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R10	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R11	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R12	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R13	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R14	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R15	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R22	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R24	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R25	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R26	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R27	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R28	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R29	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R30	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R31	7510000440	S.THERMISTOR	DTN-T203E681LS(T)
R33	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R34	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R35	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R36	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R37	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R38	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R39	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R40	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R41	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R42	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R45	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R46	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R49	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R50	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R51	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R52	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R53	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R55	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R56	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R57	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R58	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R59	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R60	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R61	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R62	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R64	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R65	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R66	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R67	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R68	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R69	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R70	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R71	7030000330	S.RESISTOR	MCR10EZHJ 390 Ω (391)
R72	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R73	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R74	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R75	7510000180	S.THERMISTOR	DTN-T203S223LS(T)
R76	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R77	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R78	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R79	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R80	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)

S. = Surface mount

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R81	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R84	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R86	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R88	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R89	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R90	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R91	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R92	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C3	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C4	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C5	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C6	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C7	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C8	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C12	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C13	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C14	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C15	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C16	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C17	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C19	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C21	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C22	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C23	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C24	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C25	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C26	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C27	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C28	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C29	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C30	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C31	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C32	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C35	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C36	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C37	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C38	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C39	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C40	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C41	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C42	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C43	4030007140	S.CERAMIC	C1608 CH 1H 121J-T-A
C44	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C45	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C46	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C47	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C48	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C52	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C53	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C54	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C55	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C56	4030007160	S.CERAMIC	C1608 CH 1H 181J-T-A
C57	4030007140	S.CERAMIC	C1608 CH 1H 121J-T-A
C58	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C59	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C60	4610000520	S.TRIMMER	TZB04N100BA006
C61	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C62	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C63	4550002950	S.TANTALUM	TESVA 0J 335M1-8L
C64	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C66	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C67	4550004090	S.TANTALUM	F95 1A475MRAAQ2
C68	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C69	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C70	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C71	4550000530	S.TANTALUM	TESVA 1V 104M1-8L
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C74	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C75	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C77	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C78	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C82	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C83	4550003040	S.TANTALUM	TEMSVB2 0J 106M-8L
C84	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C88	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C90	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C91	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C92	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C94	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C95	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C98	4510004430	S.ELECTROLYTIC	ECEV1CV220WR
C99	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C100	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C101	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C102	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C103	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C104	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C106	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C107	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C108	4510004420	S.ELECTROLYTIC	ECEV0JV330SR
C109	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C110	4550003030	S.TANTALUM	TEMSVA 0J 475M-8L
C111	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C112	4550000550	S.TANTALUM	TESVA 1V 224M1-8L
C113	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C114	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C115	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C116	4550000550	S.TANTALUM	TESVA 1V 224M1-8L
C117	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C118	4550000550	S.TANTALUM	TESVA 1V 224M1-8L
C119	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C121	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C122	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C123	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C124	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C125	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C126	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C128	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C129	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C130	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C131	4550004700	S.TANTALUM	F95 1V474MQAAQ2
C132	4550004500	S.TANTALUM	F95 1D105MQAAQ2
C133	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C134	4550004440	S.TANTALUM	F95 0J335MQAAQ2
C135	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C136	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C137	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C138	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C139	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
EP1	910038361	PCB	B 3780A

S. = Surface mount

[UHF RFA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002890	S.TRANSISTOR	2SC4228-T1 R44
Q2	1530002890	S.TRANSISTOR	2SC4228-T1 R44
D1	1790000620	S.DIODE	MA77(TW)
D2	1790000620	S.DIODE	MA77(TW)
R1	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R2	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R3	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R4	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R5	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R6	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R7	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R8	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
C1	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	910037761	PCB	B 3711A
EP2	6510008580	LEADFRAME	PT2.0-0.7-16.5 (K)

[UHF RFB BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
L1	6190000320	COIL	5HW-F367PN-157A
L2	6190000320	COIL	5HW-F367PN-157A
EP1	910020033	PCB	B 1916C

[UHF APC BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q2	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q3	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q4	1590000620	S.TRANSISTOR	FMS1 T148
Q5	1530002280	S.TRANSISTOR	2SC4081 T107 S
D1	1790000590	S.DIODE	MA110(TW)
D2	1160000060	S.DIODE	DAN202U T107
R1	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R2	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R3	7510000200	S.THERMISTOR	DTN-T203U473LS(T)
R4	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R5	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R6	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R7	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R8	7030003770	S.RESISTOR	ERJ3GEYJ 564 V (560 kΩ)

[UHF APC BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
C1	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C4	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4550003040	S.TANTALUM	TEMSVB2 0J 106M-8L
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	910037741	PCB	B 3709A
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[UHF VCO BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q2	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q3	1530002920	S.TRANSISTOR	2SC4226-T2 R25
D1	1720000370	S.VARICAP	HVU350TRF
D2	1790000620	S.DIODE	MA77(TW)
D3	1790000640	S.VARICAP	MA363B(TX)
L1	6200001520	S.COIL	MLF2012D R82K-T
L2	6200002100	S.COIL	LQN 1A 17NJ04
L3	6200002230	S.COIL	LL2012-F22NK
R1	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R2	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R3	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R4	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R5	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R6	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R7	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R8	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R9	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R10	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R11	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R12	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R13	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R14	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
C1	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C3	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C4	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4610000530	S.TRIMMER	TZB04Z060BA006
C7	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C8	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C9	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C12	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C13	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C14	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C15	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
EP1	910037822	PCB	B 3742B

S. = Surface mount

[AF BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110002420	S.IC	NJM2073M(T1)
Q1	1590001170	S.TRANSISTOR	XP1501-(TX).AB
Q2	1520000270	S.TRANSISTOR	2SB1182 TL Q
R1	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R2	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R3	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R4	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R5	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R6	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R7	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R8	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R9	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R10	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R11	7030003790	S.RESISTOR	ERJ3GEYJ 824 V (820 kΩ)
R12	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
C1	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C2	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C3	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C4	4510005610	ELECTROLYTIC	ECA 0JG 101X
C5	4510005610	ELECTROLYTIC	ECA 0JG 101X
C6	4550006050	S.TANTALUM	TEMSVA 0J 106M8L
C7	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C8	4550006050	S.TANTALUM	TEMSVA 0J 106M8L
C9	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C10	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C11	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C12	4510005610	ELECTROLYTIC	ECA 0JG 101X
C13	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C14	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
EP1	6910003420	LEADFRAME	AR1.27-0.7-12.3
EP2	910037532	PCB	B 3699B

[UHF DATA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130004170	S.IC	TC4S01F (TE85R)
IC2	1130003760	S.IC	TC4S81F (TE85R)
IC3	1130003760	S.IC	TC4S81F (TE85R)
IC4	1130003760	S.IC	TC4S81F (TE85R)
R1	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R2	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R3	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
C1	4550004060	S.TANTALUM	F95 0J106MSAAQ2
EP1	910035772	PCB	B 3587B
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[DCJ BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
C1	4010000500	CERAMIC	DD104 B 102K 50V
EP1	910037081	PCB	B 3659A

[CONNECT UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
D1	1790001130	S.DIODE	D2FS4-4063
R1	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
J1	6510010880	CONNECTOR	52022-1410
J2	6510012620	CONNECTOR	52022-2010
EP1	910037124	PCB	B 3674D
EP2	910037631	FPC	B 3730A

[PTT BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
S1	2260001680	S.SWITCH	SKQDPB
EP1	910037150	FPC	B 3649

[V-L BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
R1	7210001910	VARIABLE	RV-199(RK0972210)10KB/10KA
R2	7210001910	VARIABLE	RV-199(RK0972210)10KB/10KA
S1	2260001400	ENCODER	SW-122 (RK097103H)
EP1	910037003	FPC	B 3650C

[CHARGE ADAPTER AD-25] (except SEA)

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110001990	S.IC	TL497ACNS
Q1	1540000030	TRANSISTOR	2SD526-O(Z)
Q2	1540000330	S.TRANSISTOR	2SD1758 TLQ
Q3	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q4	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q5	1530002280	S.TRANSISTOR	2SC4081 T107 S

S. = Surface mount

[CHARGE ADAPTER AD-25] (except SEA)

REF. NO.	PARTS NO.	DESCRIPTION	
D1	1750000130	S.DIODE	DA204U T107
D2	1750000130	S.DIODE	DA204U T107
D3	1160000050	S.DIODE	DAP202U T107
D4	1730000820	S.ZENER	RD8.2M-T2B3
D5	1790000670	S.DIODE	SB07-03C-TA
D6	1790000670	S.DIODE	SB07-03C-TA
D7	1790000670	S.DIODE	SB07-03C-TA
L1	6180001020	COIL	LAL 04NA 331K
R1	7030000130	S.RESISTOR	MCR10EZHJ 8.2 Ω (8R2)
R2	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R3	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R4	7030000170	S.RESISTOR	MCR10EZHJ 18 Ω (180)
R5	7030000120	S.RESISTOR	MCR10EZHJ 6.8 Ω (6R8)
R6	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R7	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R8	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R9	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R10	7030000160	S.RESISTOR	MCR10EZHJ 15 Ω (150)
R11	7030000160	S.RESISTOR	MCR10EZHJ 15 Ω (150)
R12	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R13	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R14	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
C1	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C2	4550000340	TANTALUM	DN 1C 100M
C3	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C4	4030006770	S.CERAMIC	C1608 SL 1H 151J-T-A
C5	4510002740	ELECTROLYTIC	10 SS 220μF
C6	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C7	4550000340	TANTALUM	DN 1C 100M
C8	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
DS1	5040001470	LED	SLC-22VR 3F
S1	2260000120	SWITCH	D2MS
EP1	910037512	PCB	B 3700B
EP2	910037502	PCB	B 3701B

[TSQL UNIT] (U.S.A only)

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130005100	S.IC	FX365LG
IC2	1130005100	S.IC	FX365LG
IC3	1130003610	S.IC	TC4SU69F (TE85R)
Q1	1590000430	S.TRANSISTOR	DTC144EU T107
Q2	1510000580	S.TRANSISTOR	2SA1362-GR (TE85R)
Q3	1590000430	S.TRANSISTOR	DTC144EU T107
Q4	1510000580	S.TRANSISTOR	2SA1362-GR (TE85R)
Q5	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q6	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q7	1530002280	S.TRANSISTOR	2SC4081 T107 S
D1	1790000590	S.DIODE	MA110(TW)
D2	1790000590	S.DIODE	MA110(TW)
D3	1790000870	S.DIODE	MA1S121(TX)
D4	1160000060	S.DIODE	DAN202U T107
D5	1790000870	S.DIODE	MA1S121(TX)
X1	6060000480	CERAMIC	CSB1000J221T
R1	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R2	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R3	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R4	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R5	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R6	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R7	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R9	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R10	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R11	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R12	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R13	7310003550	S.TRIMMER	MVR32HXBR N473
R14	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R15	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R16	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R17	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R18	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R19	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R20	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R21	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R22	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R23	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R24	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R25	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R26	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 kΩ)
R27	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R28	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R29	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R30	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R31	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R32	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R33	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R34	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
C1	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C4	4550000420	S.TANTALUM	TESVA 1A 105M1-8L
C5	4550000530	S.TANTALUM	TESVA 1V 104M1-8L
C6	4030006540	S.CERAMIC	C1608 SL 1H 030C-T-A
C7	4550002950	S.TANTALUM	TESVA 0J 335M1-8L
C8	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C9	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C10	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C11	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C12	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C13	4550000420	S.TANTALUM	TESVA 1A 105M1-8L
C15	4030006540	S.CERAMIC	C1608 SL 1H 030C-T-A
C16	4550000530	S.TANTALUM	TESVA 1V 104M1-8L
C17	4550002950	S.TANTALUM	TESVA 0J 335M1-8L
C18	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C19	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	910030531	PCB	B 3110A

S. = Surface mount

SECTION 7 MECHANICAL PARTS LIST

7-1 CHASSIS PARTS

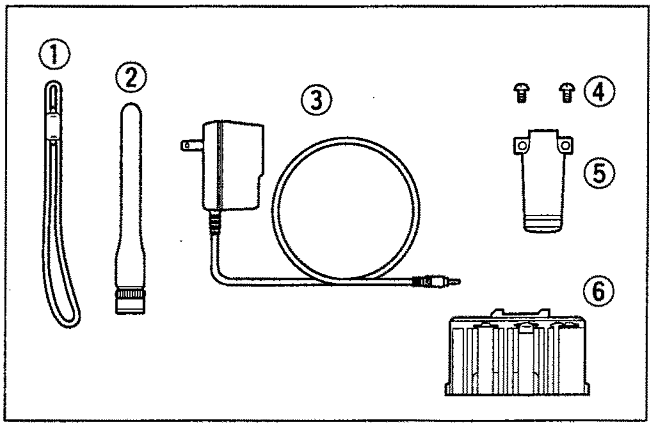
LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8210008340	Front panel IC-W21A	1
	8210008350	Front panel IC-W21E	
②	8810005360	Screw PH M2 x 3 ZK	3
③	8810006980	Screw FH M2 x 3.5 NI	1
④	8930026250	1257 SW-C rubber	1
⑤	8930026240	1257 SW-B rubber	1
⑥	8930026230	1257 SW-A rubber	1
⑦	8930026310	1257 SW holder	1
⑧	8810001700	Tapping screw PH B0 1.4 x 3	8
⑨	2510000580	Speaker EAS-29104D	1
⑩	8430024900	1132 Speaker holder	1
⑪	8930027020	Isolating sheet (D)	1
⑫	8930026260	LED lens	1
⑬	8930014940	752 Microphone holder	1
⑭	7700000861	Microphone WM-62A103	1
⑮	8930027050	1257 Display cover	1
⑯	8930026290	1257 LCD holder	1
⑰	5030000890	LCD LD-BU5545J	1
⑱	8930026660	LCD contact SRCN-1257	2
⑲	8930027300	White sheet (H)	1
⑳	8930027740	1266 Contact spring	2
㉑	8930026222	1257 Contact base-2	1
㉒	8930026371	1257 Microphone contact-1	2
㉓	8930026350	A-angle	1
㉔	8810004980	Tapping screw PH B0 1.4 x 4.5 NI	4
㉕	8930026360	B-angle	1
㉖	7210001910	[VHF VR/SQL] control RV-199	1

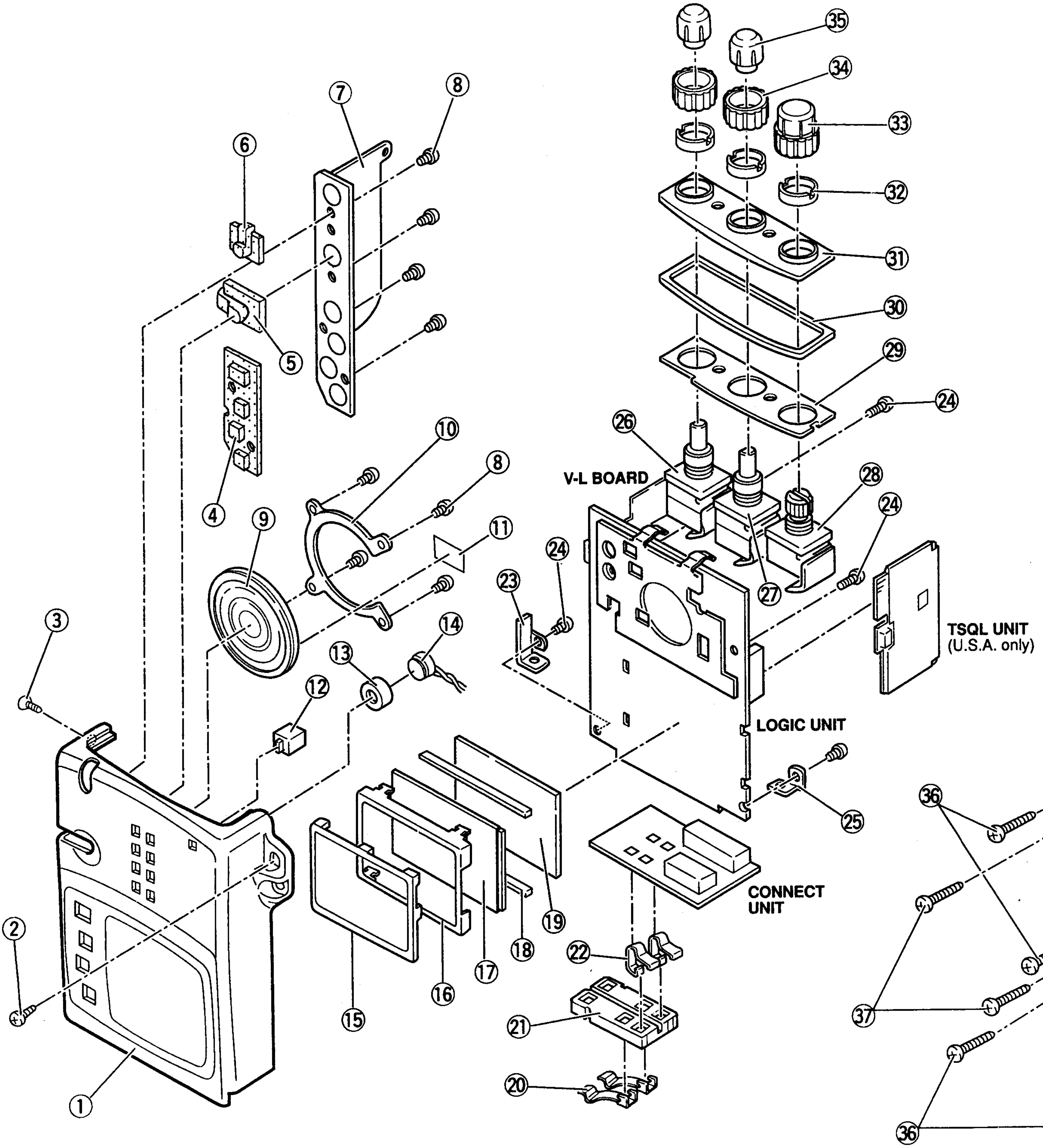
LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
㉗	7210001910	[UHF VR/SQL] control RV-199	1
㉘	2260001400	[DIAL] selector SW-122	1
㉙	8830000710	1257 Top plate	1
㉚	8930026330	1257 Top seal	1
㉛	8210007940	1257 Top panel	1
㉜	8830000710	VR nut (G)	3
㉝	8610008310	Knob N-200	1
㉞	8610008291	Knob N-198-1	2
㉟	8610008300	Knob N-199	2
㊱	8810007720	Screw PH M2 x 14 NI	4
㊲	8810007710	Screw PH M2.6 x 14.5	2
㊳	8930027760	1257 plate	1
㊴	8510007910	1257 V-VCO case	1
㊵	8010013900	1257 RF chassis	1
㊶	8810006610	Screw PH M2 x 2.5 NI	2
㊷	8930004081	Grounding spring (B)-1	1
㊸	8510007900	1257 U-VCO case	1
㊹	8930026270	1257 Release button	1
㊺	8930026210	1257 PTT rubber	1
㊻	8930026340	1257 Connector seal	1
㊼	8210007921	1257 Rear panel	1
㊽	8930026451	1257 Jack cap-1	1
㊾	6510015550	BNC-R117 (incl. Nut)	1
㊿	8930027680	Sponge (DB)	1
(51)	8930026280	1257 Bottom plate	1
(52)	8810007100	Screw FH M2 x 2.5 NI	4
(53)	8930027340	1257 Bottom angle	1

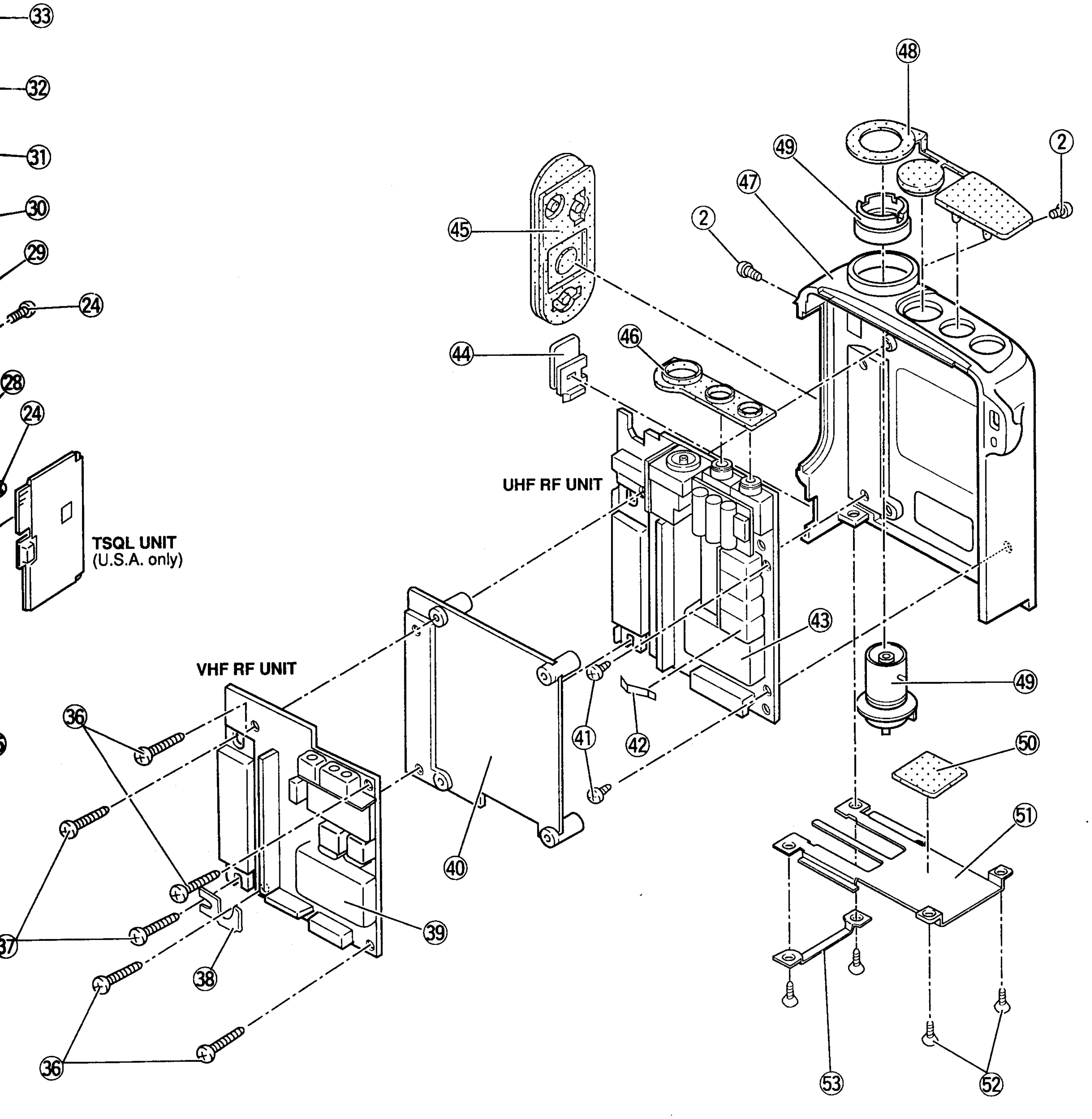
Screw abbreviations
PH: Pan head FH: Flat head
NI: Nickel ZK: Black

7-2 ACCESSORIES

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8010013920	Handstrap HK-006	1
②	Optional product	FA-B270A Flexible antenna	1
③	Optional product	Wall charger BC-77A (USA)	1
		Wall charger BC-77D (EUR, ITA)	1
		Wall charger BC-77V (AUS)	1
④	8810005730	Screw BuH M3 x 3 ZK BS	1
⑤	8010008620	752 Belt clip	2
⑥	Optional product	Battery pack BP-131 (USA, EUR, ITA, UK, AUS)	1
		Battery case BP-130 (ASIA)	

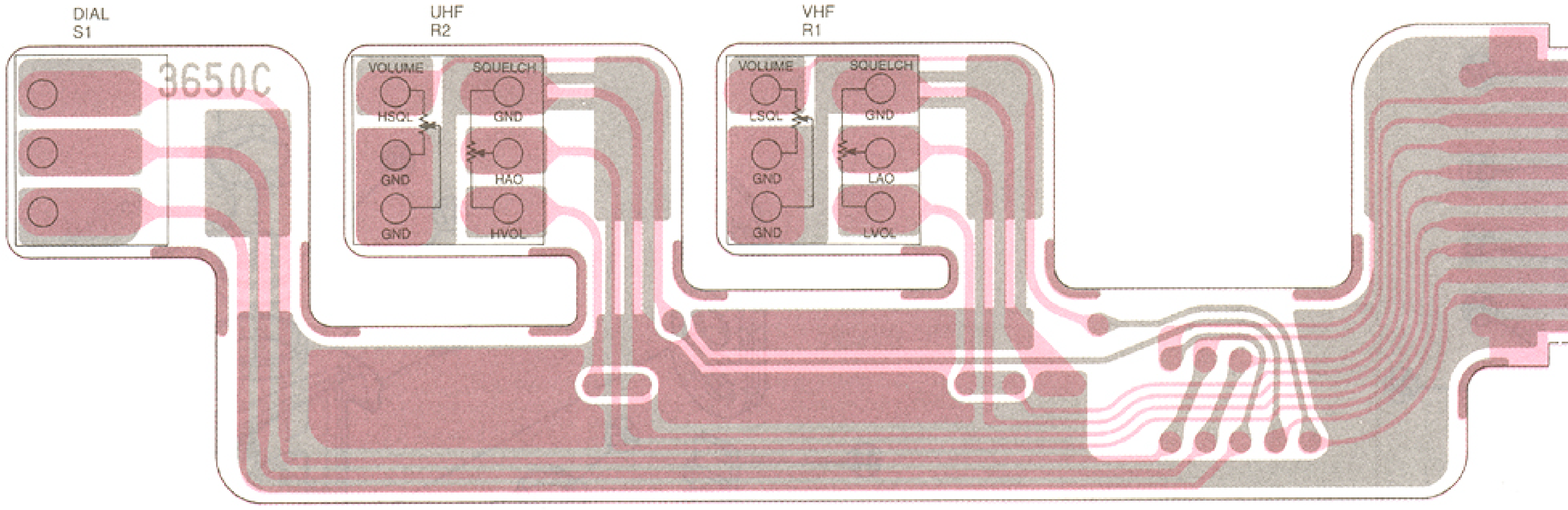



㉟
㉞
㉝
㉜
㉛
㉚
㉙
⑦
⑧
⑥
⑤
④
㉔
㉖
⑩
⑧
V-L BOARD
㉘
㉔
⑨
⑪
㉔
㉓
㉗
TSQL UNIT
(U.S.A. only)
③
⑭
⑬
⑫
LOGIC UNIT
㊱
㉕
CONNECT
UNIT
②
⑲
㉒
⑱
⑰
⑯
㊲
㉑
⑮
⑳
①
㊱

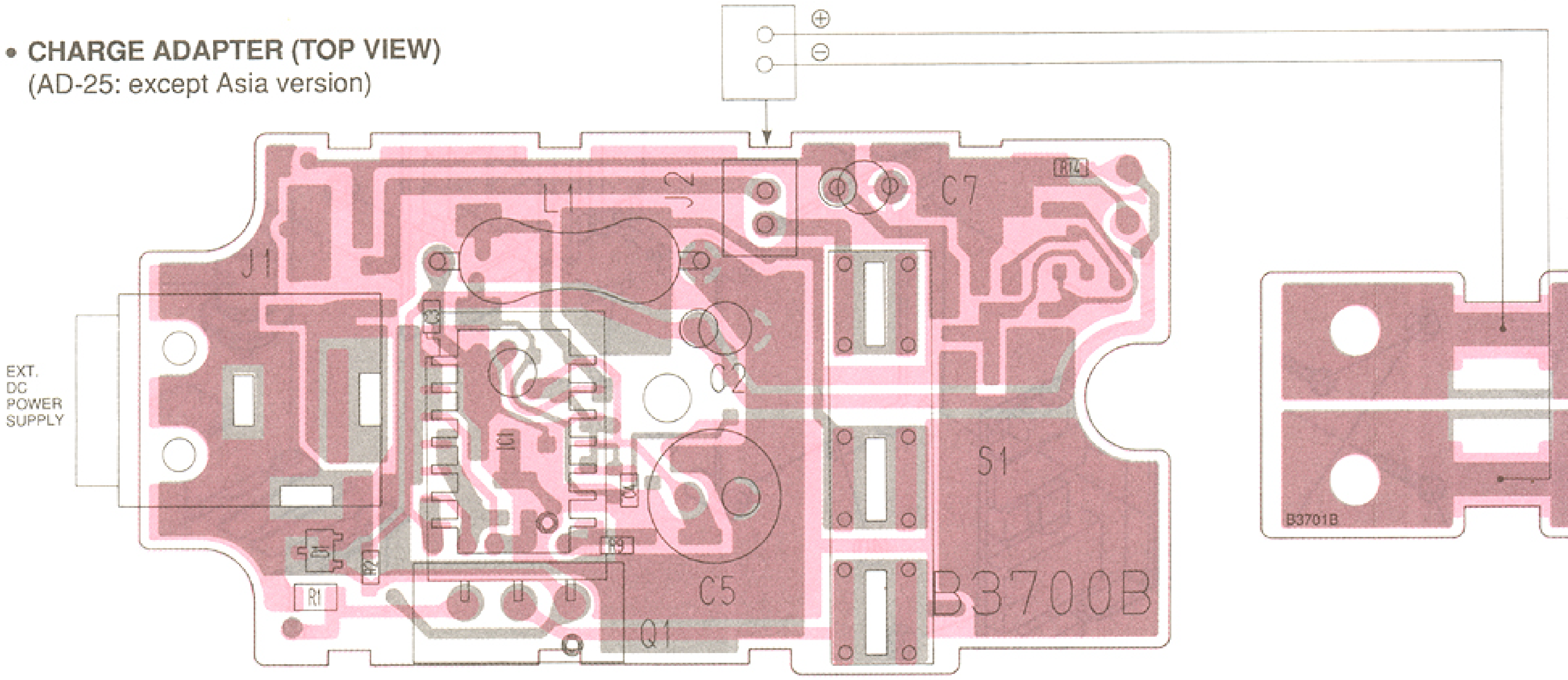

TSQL UNIT
(U.S.A. only)
UHF RF UNIT
VHF RF UNIT

SECTION 8 BOARD LAYOUTS

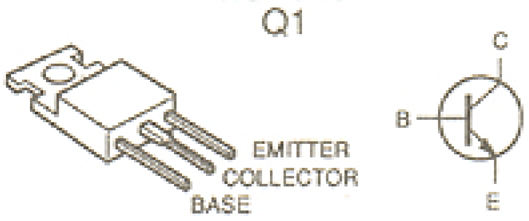
8-1 V-L BOARD, CONNECT UNIT AND CHARGE ADAPTER (AD-25)


DIAL
S1
3650C
UHF
R2
VOLUME
SQUELCH
HSQL
GND
GND
GND
HAO
HVOL
VHF
R1
VOLUME
SQUELCH
LSQL
GND
GND
GND
LAO
LVOL

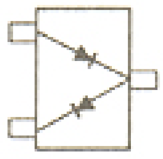
- **CHARGE ADAPTER (TOP VIEW)**
(AD-25: except Asia version)


⊕
⊖
EXT.
DC
POWER
SUPPLY
J1
L1
J2
C7
R14
C3
C2
IC1
C4
S1
D1
R2
R1
R3
C5
Q1
B3700B
B3701B

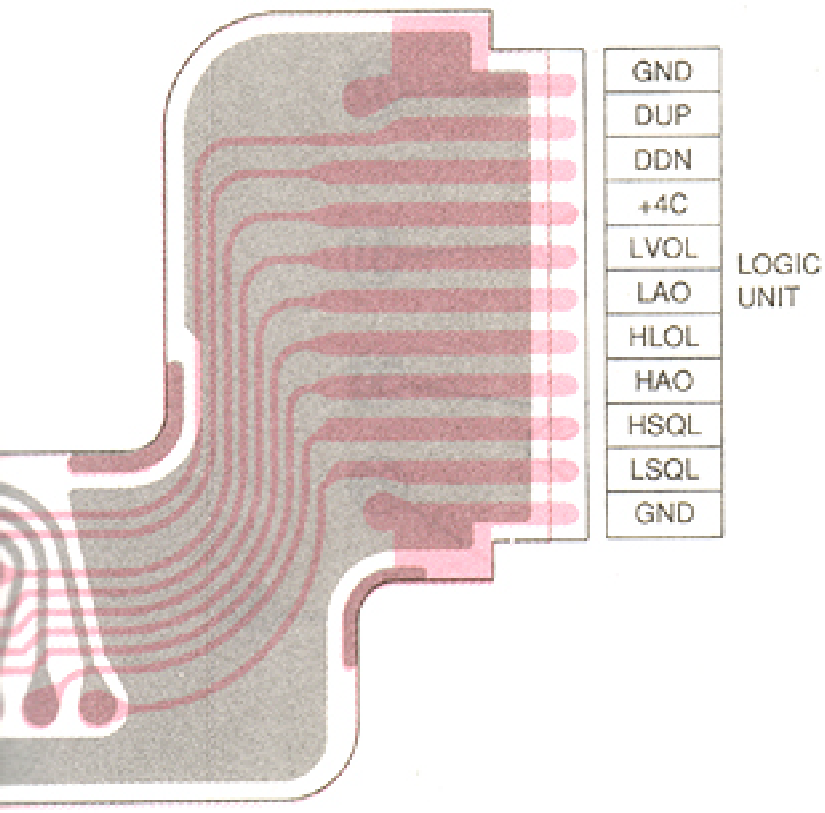
2SD526
Q1


EMITTER
COLLECTOR
BASE
C
B
E

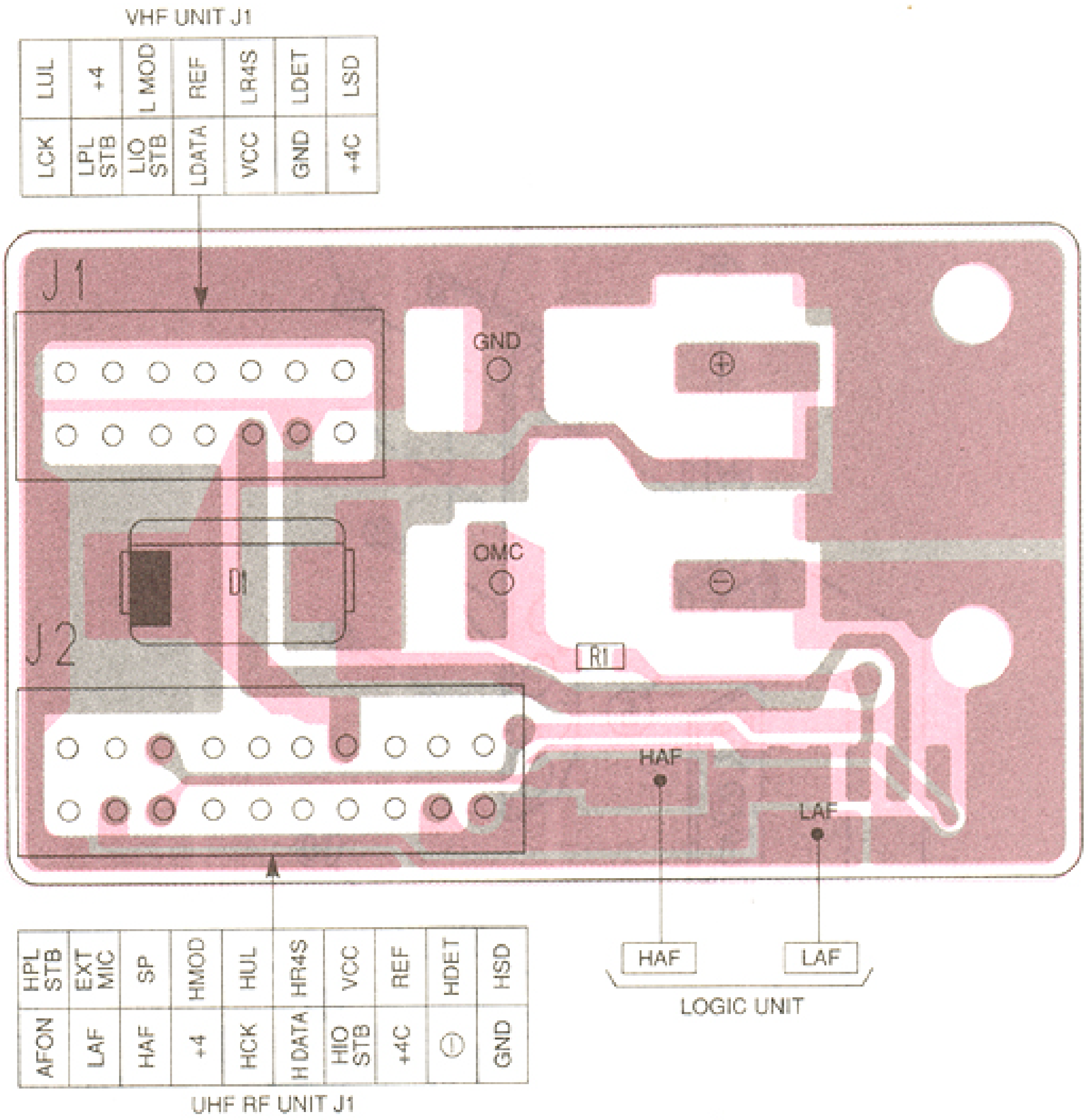
DA204U
D1

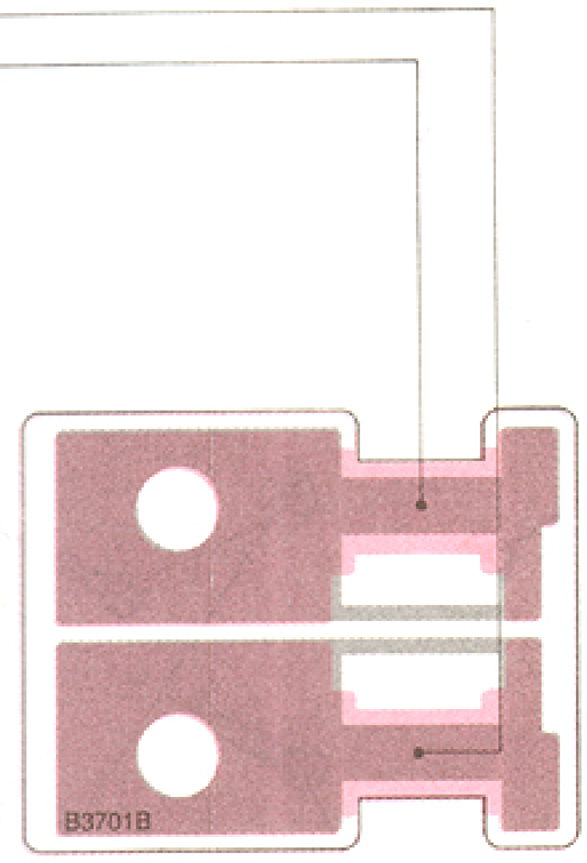


Symbol: K


GND
DUP
DDN
+4C
LVOL
LAO
HLOL
HAO
HSQL
LSQL
GND
LOGIC UNIT

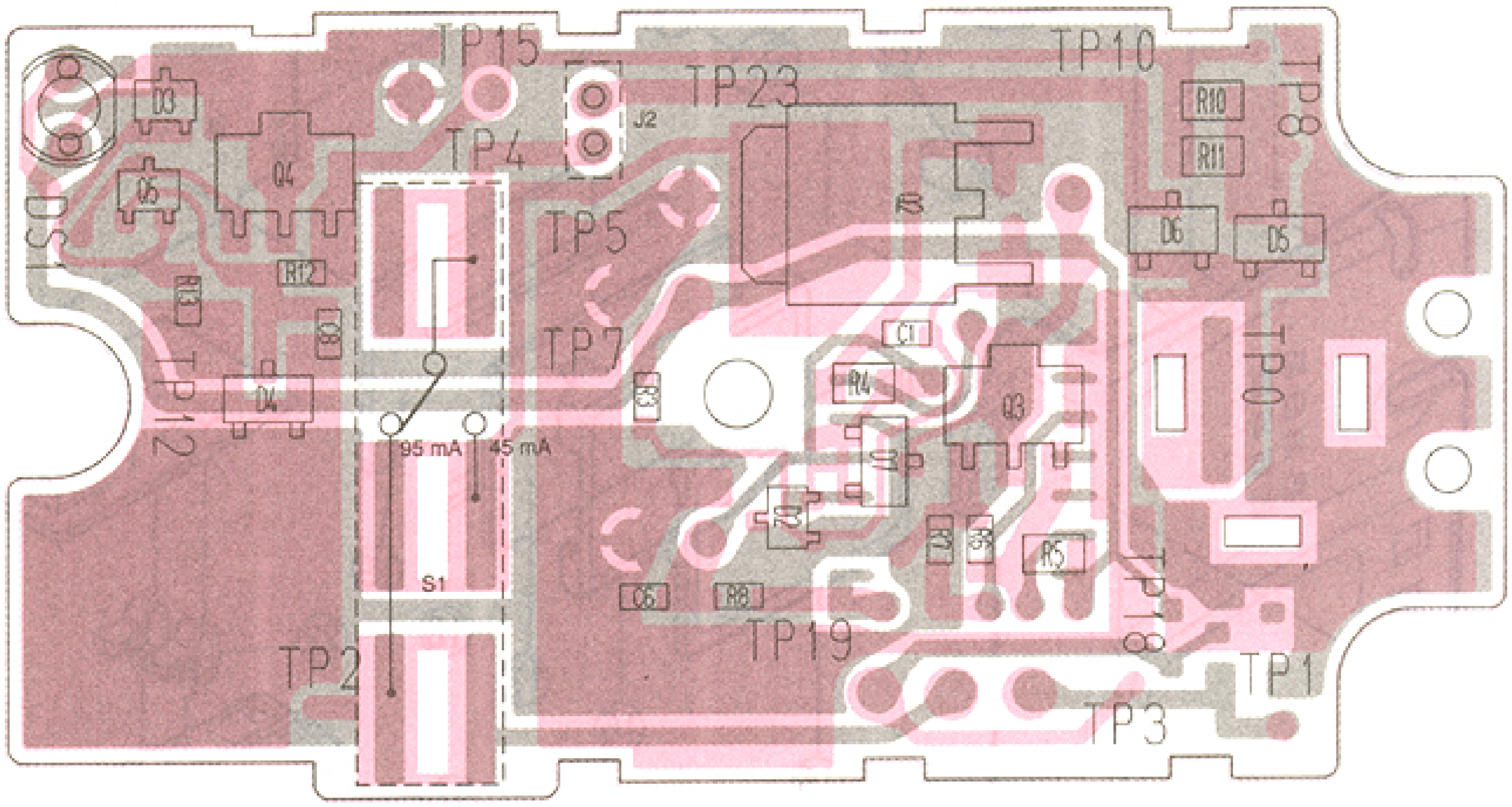
• CONNECT UNIT (TOP VIEW)


VHF UNIT J1
LUL
+4
L MOD
REF
LR4S
LDET
LSD
LCK
LPL STB
LIO STB
LDATA
VCC
GND
+4C
J1
GND
⊕
OMC
⊖
D1
J2
R1
HAF
LAF
HPL STB
EXT MIC
SP
HMOD
HUL
HR4S
VCC
REF
HDET
HSD
AFON
LAF
HAF
+4
HCK
H DATA
HIO STB
+4C
⊖
GND
UHF RF UNIT J1
HAF
LAF
LOGIC UNIT

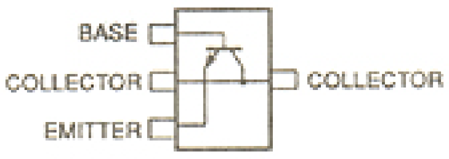


• CHARGE ADAPTER (BOTTOM VIEW)

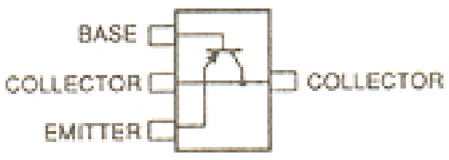
(AD-25: except Asia version)


TP15
TP10
TP8
D3
Q4
Q5
J2
TP23
TP4
DS1
TP5
R10
R11
D6
D5
R12
R13
C3
TP7
C1
R4
Q3
R3
TP12
D4
D2
R2
R6
R5
95 mA
45 mA
S1
C5
R8
TP19
TP18
TP2
TP1
TP3

2SD1758
Q2

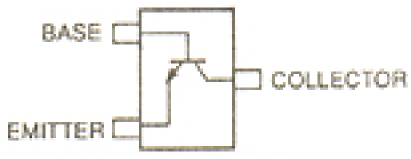

BASE
COLLECTOR
EMITTER
COLLECTOR

2SB798
Q3, Q4


BASE
COLLECTOR
EMITTER
COLLECTOR

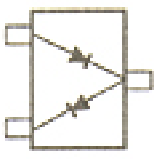
Symbol: DK/DL

2SC4081
Q5


BASE
EMITTER
COLLECTOR

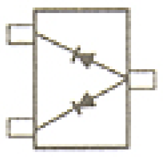
Symbol: BR/BS

DA204U
D2



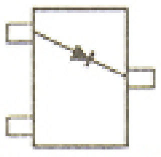
Symbol: K

DAP202U
D3



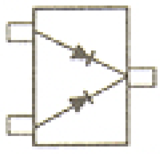
Symbol: P

RD8.2M
D4



Symbol: 822

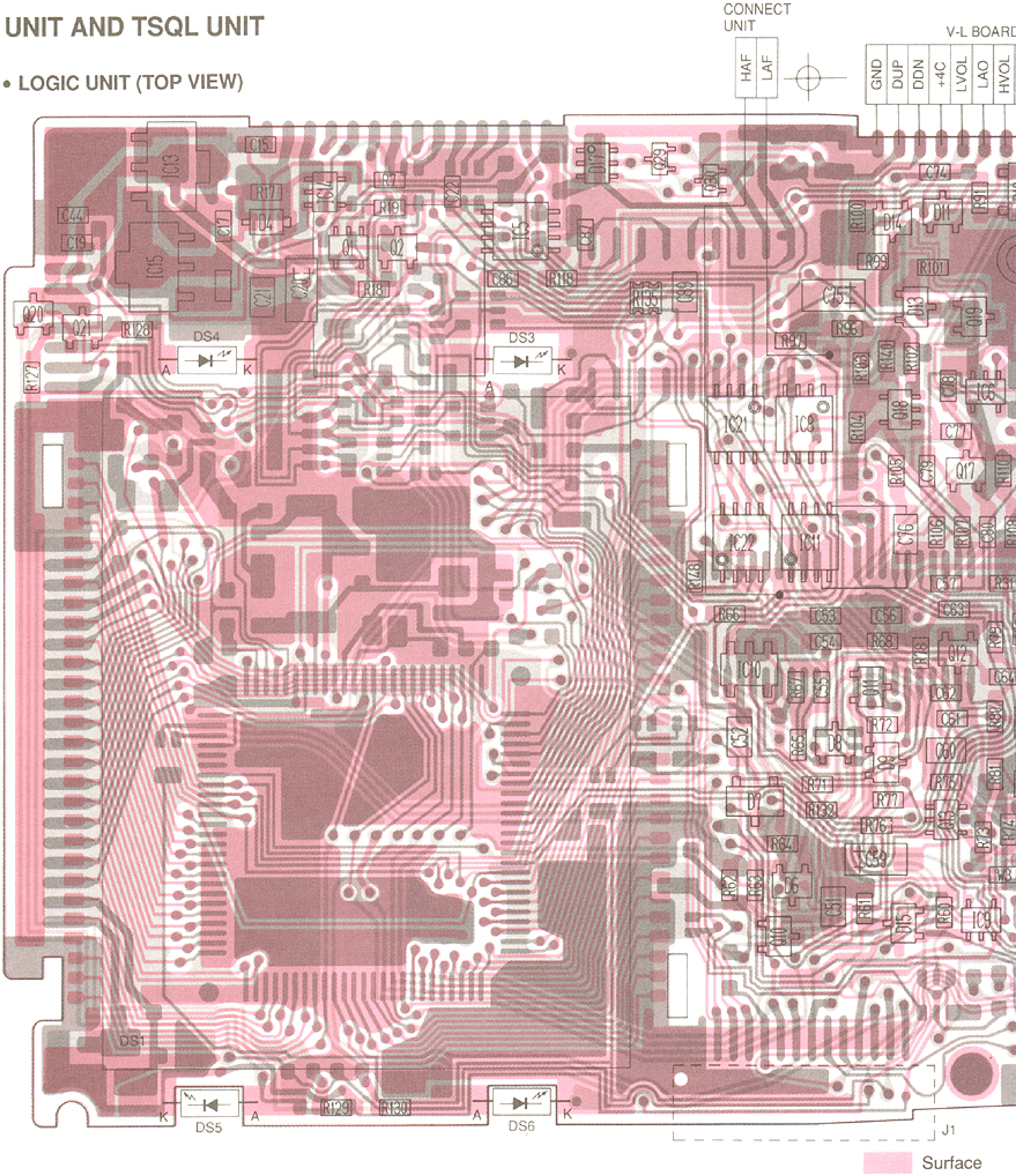
SB07-03C
D5, D6, D7



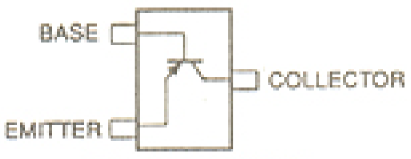
Symbol: J

8-2 LOGIC UNIT AND TSQL UNIT

• LOGIC UNIT (TOP VIEW)

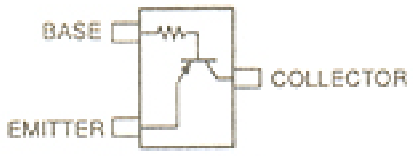

CONNECT UNIT
HAF
LAF
V-L BOARD
GND
DUP
DDN
+4C
LVOL
LAO
HVOL
IC13
C15
C44
C19
IC15
C17
R17
D4
C21
C20
C14
R7
R19
C22
Q1
Q2
R18
IC5
C86
R118
C84
D17
Q29
Q30
R135
C39
Q20
Q21
R128
R127
DS4
DS3
A
K
C74
R100
D14
D11
R91
R99
R101
C75
D13
Q19
R96
R97
R103
R140
R102
C78
IC6
IC21
IC8
R104
Q18
C77
R105
C79
Q17
R110
IC22
IC11
C76
R106
R107
C80
R108
R148
C57
R31
R66
C53
C56
C63
C54
R68
R78
Q12
R109
IC10
R67
C55
Q11
C62
C64
C61
R80
R72
C52
R65
D8
D9
C60
R71
R75
R81
D7
R132
R77
Q13
R76
R73
R74
R64
C59
R62
R63
D6
C51
R61
D15
R60
IC9
Q10
W3
DS1
DS5
DS6
R129
R130
J1
Surface

2SA1576
Q2, Q3


BASE
EMITTER
COLLECTOR

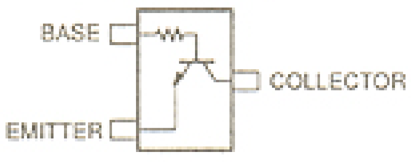
Symbol: FR/FS

UN9110
Q7


BASE
EMITTER
COLLECTOR

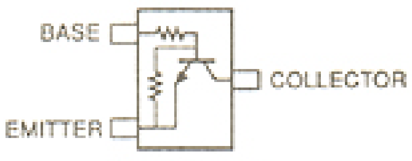
Symbol: 6L

UN9210
Q29, Q30


BASE
EMITTER
COLLECTOR

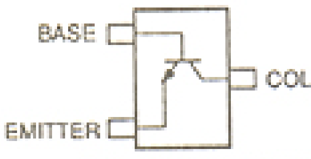
Symbol: 8L

UN9211
Q8


BASE
EMITTER
COLLECTOR

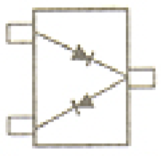
Symbol: 8A

2SC4081
Q10 – Q12,
Q14 – Q17
Q19 – Q21


BASE
EMITTER
COL

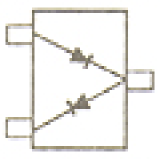
Symbol: BR/BS

HSM88AS
D7, D12



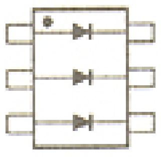
Symbol: C1

DA204U
D6, D8 – D11,
D13 – D15, D26



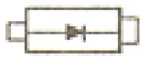
Symbol: K

MA1S121
D17



Symbol: M2D

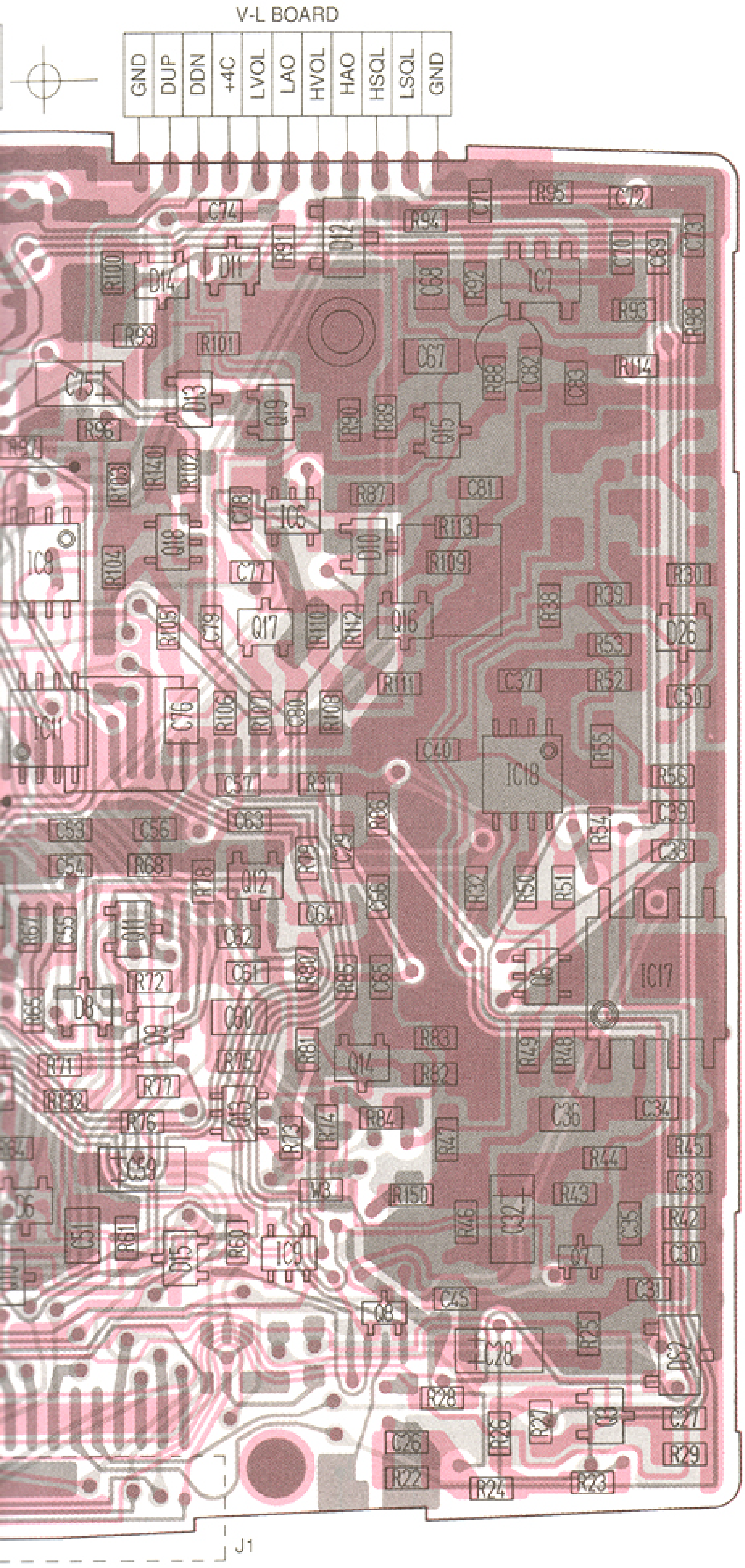
MA110
D4



Symbol: 1A

The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.

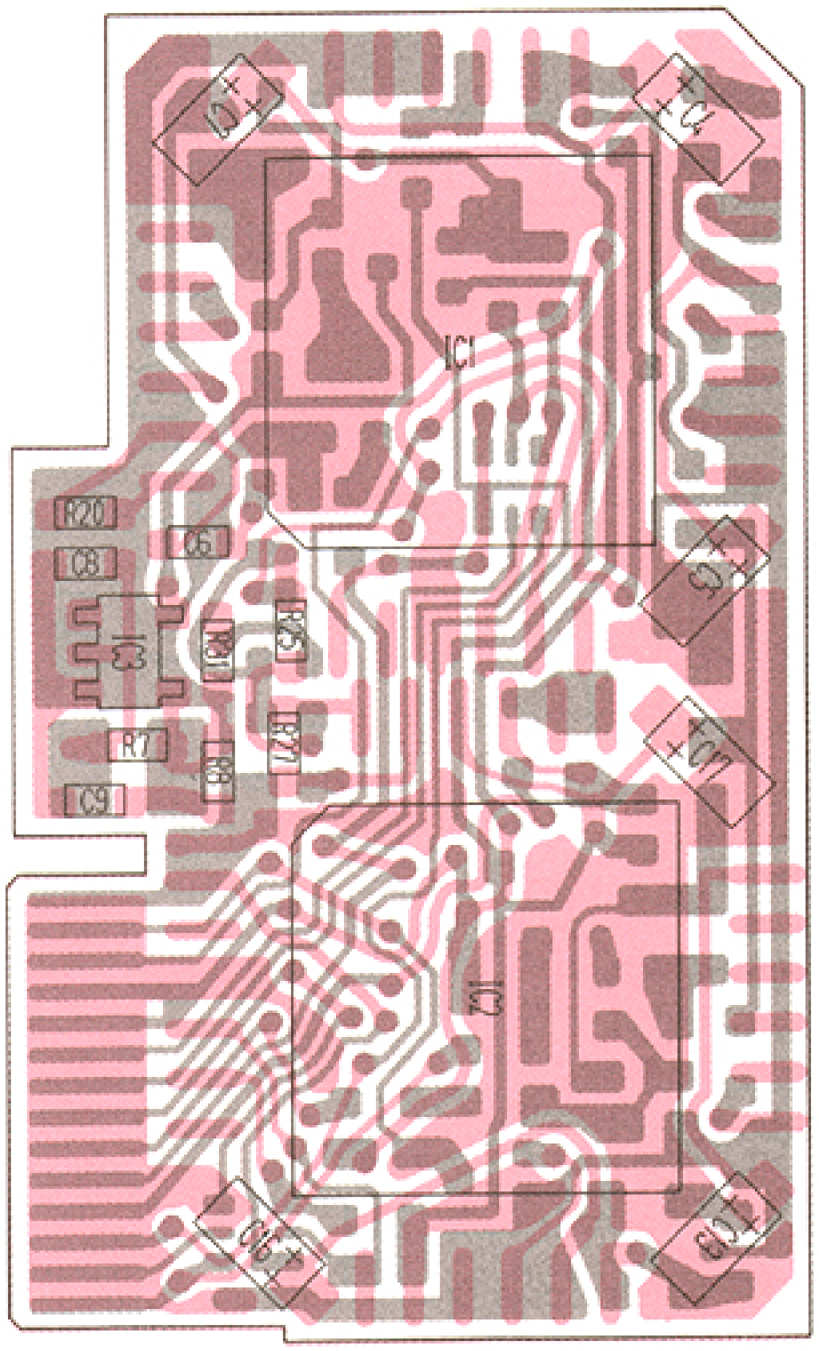
CT


V-L BOARD
GND
DUP
DDN
+4C
LVOL
LAO
HVOL
HAO
HSQL
LSQL
GND
IC6
IC7
IC8
IC9
IC11
IC17
IC18
D8
D10
D11
D12
D13
D14
D15
Q7
Q8
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
C28
C36
C59
C67
J1

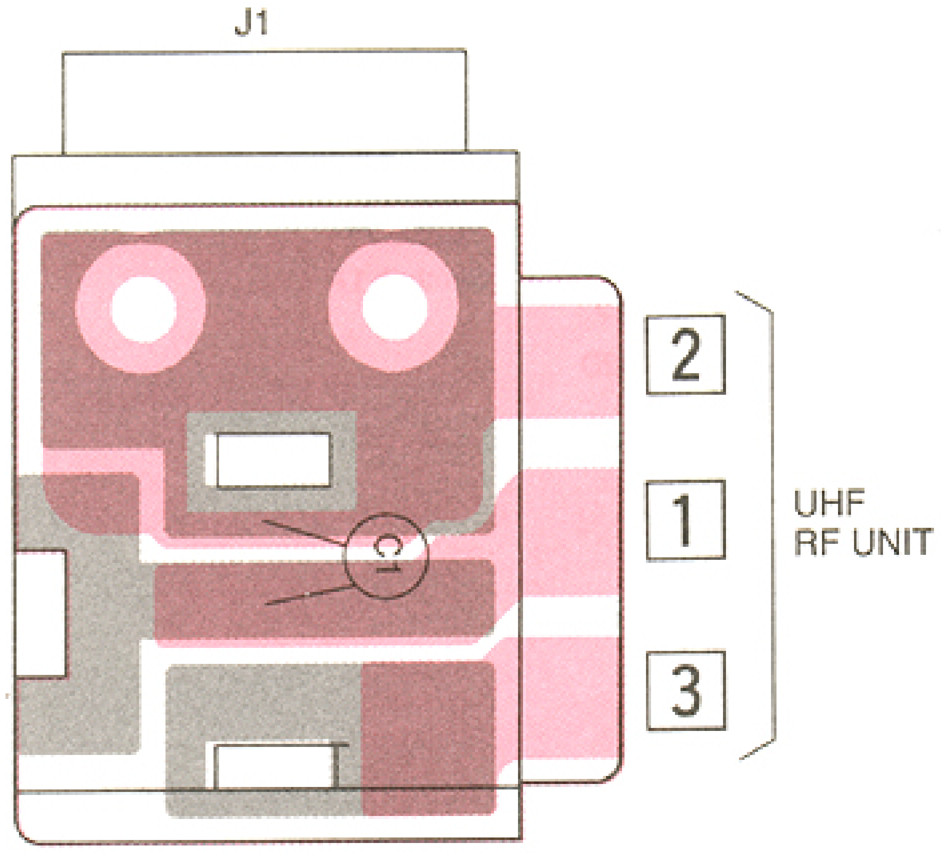
▨ Surface ▨ Inside ▨ Underside

• TSQL UNIT (TOP VIEW)

(U.S.A. only)


IC1
R20
C8
C6
C1
R7
C9
C3
C4

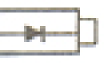
• DCJ BOARD (TOP VIEW)


J1
C1
2
1
3
UHF
RF UNIT

COLLECTOR

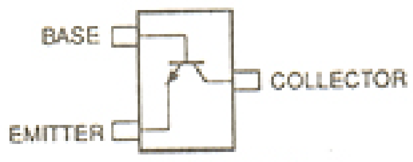
A

MA110
D4



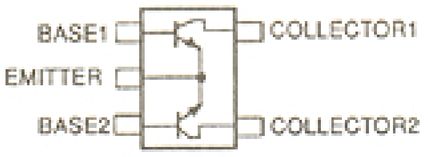
Symbol: 1A

2SC4081
Q10 – Q12,
Q14 – Q17
Q19 – Q21


BASE
COLLECTOR
EMITTER

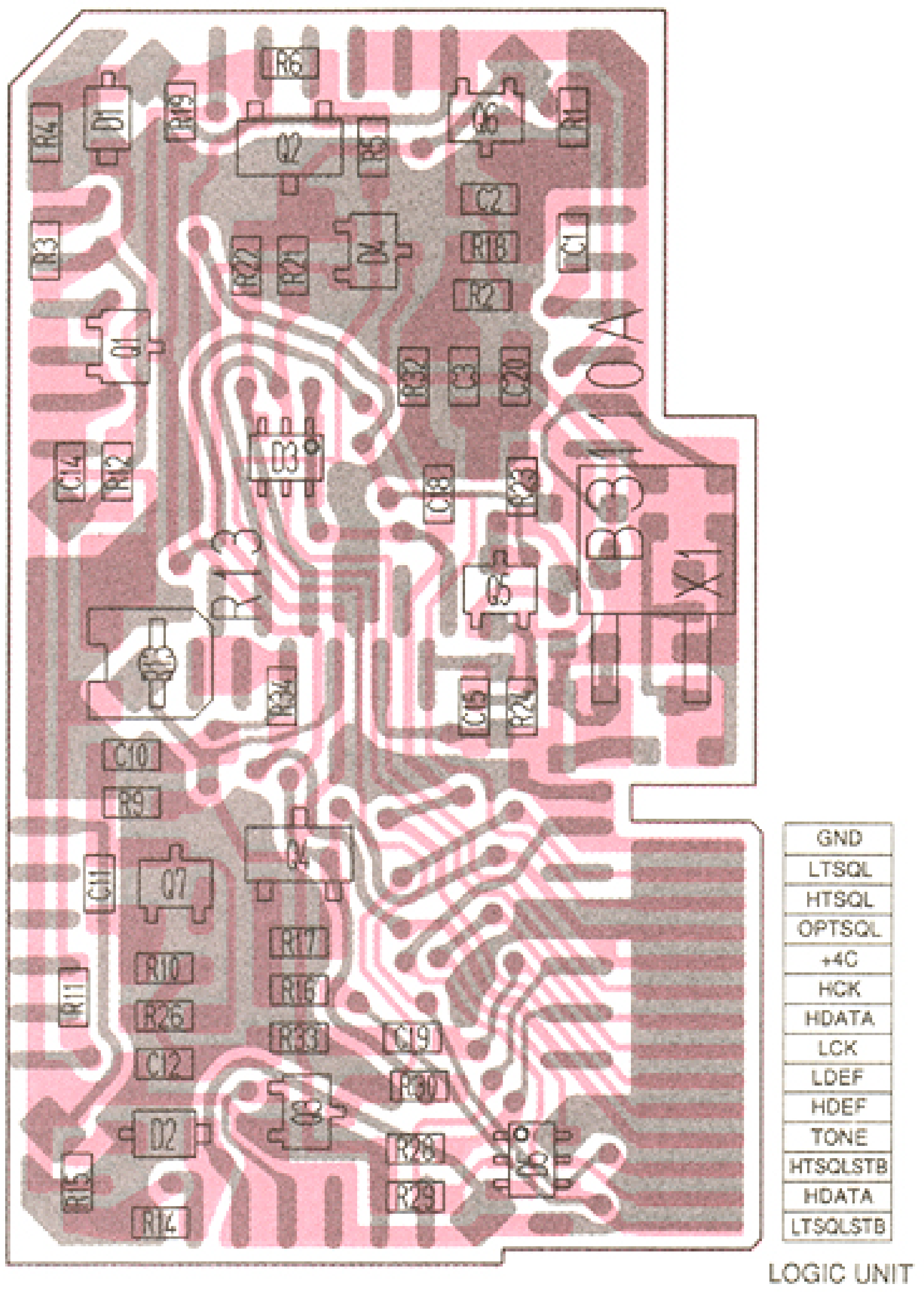
Symbol: BR/BS

XP1501
Q1, Q6,
Q13, Q18

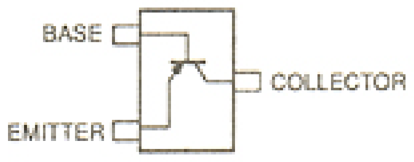

BASE1
EMITTER
BASE2
COLLECTOR1
COLLECTOR2

Symbol: 5R

• TSQL UNIT (BOTTOM VIEW)
(U.S.A. only)

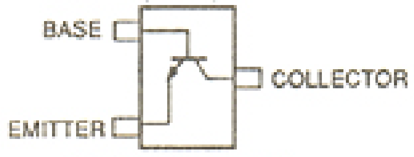

R6
R4
D1
R19
Q2
R5
Q6
R1
C2
R18
C1
R3
R22
R21
D4
R2
Q1
R32
C3
C20
B3110A
D3
C8
R23
C14
R12
R13
Q5
X1
R34
C15
R24
C10
R9
Q4
C11
Q7
R17
R10
R16
R11
R26
R33
C19
C12
R30
Q3
R28
D2
D5
R15
R14
R29
GND
LTSQL
HTSQL
OPTSQL
+4C
HCK
HDATA
LCK
LDEF
HDEF
TONE
HTSQLSTB
HDATA
LTSQLSTB
LOGIC UNIT

2SA1362
Q2, Q4


BASE
COLLECTOR
EMITTER

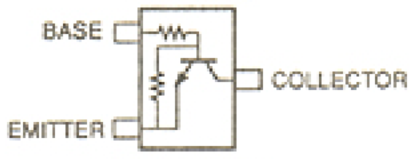
Symbol: AEL/AEG

2SC4081
Q5, Q6, Q7


BASE
COLLECTOR
EMITTER

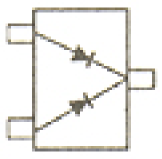
Symbol: BR/BS

DTC114EU
Q1, Q3


BASE
COLLECTOR
EMITTER

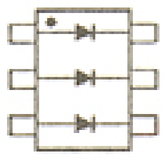
Symbol: 24

DAN202U
D4



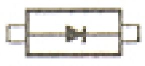
Symbol: N

MA1S121
D3, D5



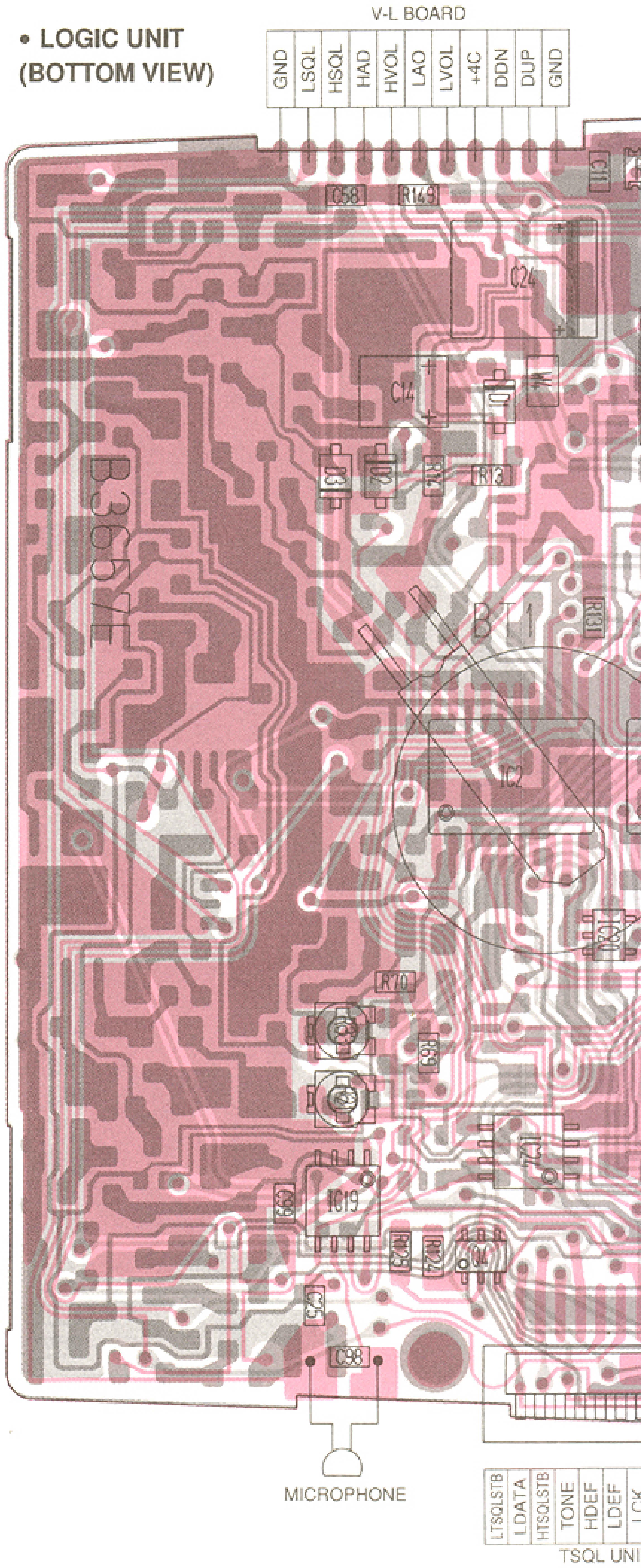
Symbol: M2D

MA110
D1, D2

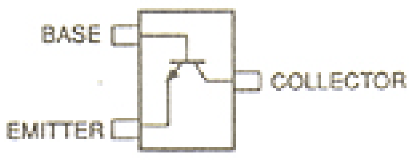


Symbol: 1A

• LOGIC UNIT (BOTTOM VIEW)

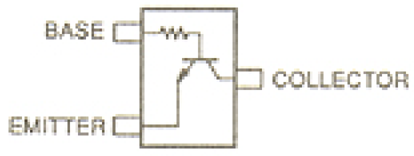

V-L BOARD
GND
LSQL
HSQL
HAD
HVOL
LAO
LVOL
+4C
DDN
DUP
GND
C58
R149
C11
C24
C14
W1
D1
C3
D2
R14
R13
B3657E
BT1
R131
IC2
Q20
R70
R69
IC21
IC19
C99
R23
R24
Q4
C55
C98
MICROPHONE
LTSQLSTB
LDATA
HTSQLSTB
TONE
HDEF
LDEF
TSQL UNI

2SC4081
Q21 – Q23


BASE
COLLECTOR
EMITTER

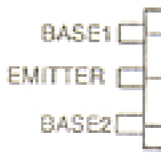
Symbol: BR/BS

UN9210
Q25, Q27

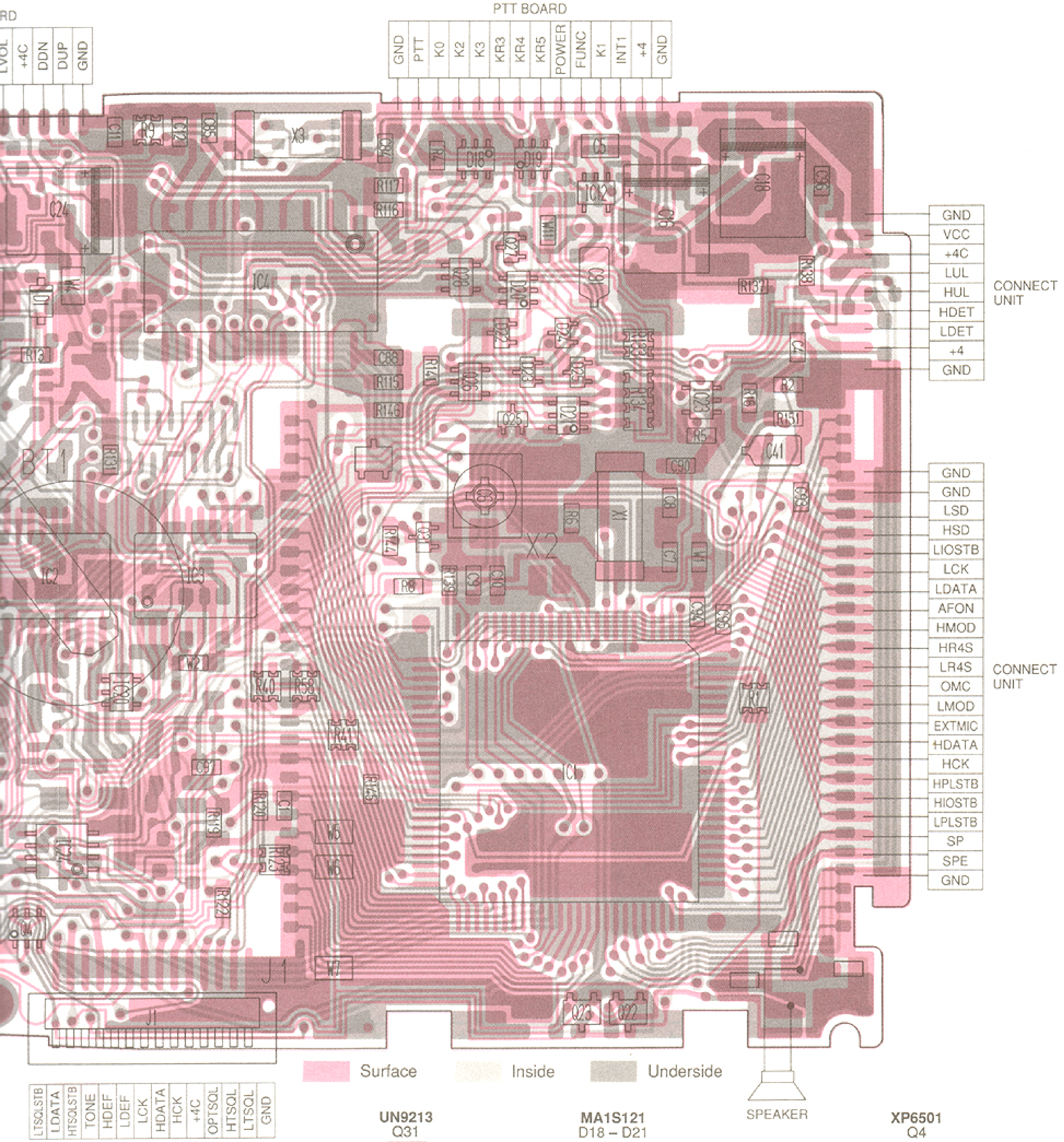

BASE
COLLECTOR
EMITTER

Symbol: 8L

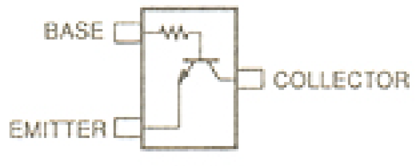
X
Q2


BASE1
EMITTER
BASE2

Sy

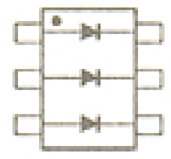

RD
LVOL
+4C
DDN
DUP
GND
PTT BOARD
GND
PTT
K0
K2
K3
KR3
KR4
KR5
POWER
FUNC
K1
INT1
+4
GND
GND
VCC
+4C
LUL
HUL
HDET
LDET
+4
GND
CONNECT UNIT
GND
GND
LSD
HSD
LIOSTB
LCK
LDATA
AFON
HMOD
HR4S
LR4S
OMC
LMOD
EXTMIC
HDATA
HCK
HPLSTB
HIOSTB
LPLSTB
SP
SPE
GND
CONNECT UNIT
C11
R9
C12
C85
X3
C94
R7
D18
D19
C5
R117
R116
IC12
C96
C18
C24
C6
R138
R137
IC4
W4
Q28
Q27
D20
C9
W11
D1
R13
C88
R115
R146
R141
Q26
D22
D23
D24
Q24
R133
R134
Q25
Q21
IC23
R16
R2
R151
R5
C4
C41
BT1
R131
C90
X1
R6
C8
R174
Q31
X2
C3
W1
IC2
IC3
R8
R139
C9
C10
C24
C95
W2
R40
R58
R7
IC20
R41
C97
IC1
R125
R120
C1
R19
W5
W6
R123
IC21
R122
Q4
J1
W7
J1
Q23
Q22
SPEAKER
LTSQLSTB
LDATA
HTSQLSTB
TONE
HDEF
LDEF
LCK
HDATA
HCK
+4C
OPTSQL
HTSQL
LTSQL
GND
TSQL UNIT (USA Only)
Surface
Inside
Underside

UN9213
Q31


BASE
EMITTER
COLLECTOR

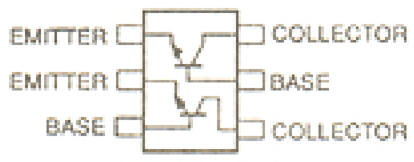
Symbol: 8C

MA1S121
D18 – D21



Symbol: M2D

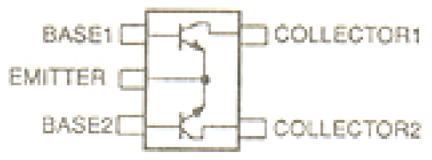
XP6501
Q4


EMITTER
EMITTER
BASE
COLLECTOR
BASE
COLLECTOR

Symbol: 5N

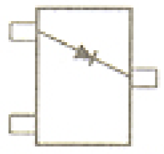
LLECTOR

XP1210
Q26, Q28


BASE1
EMITTER
BASE2
COLLECTOR1
COLLECTOR2

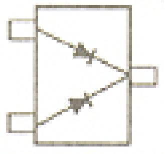
Symbol: AC

MA132K
D22 (EUR, UK, USA, AUS, SEA)
D24 (UK, AUS)



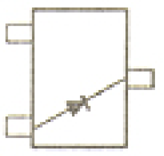
Symbol: MI

MA132WK
D23 (ITA)
D24 (SEA)



Symbol: MU

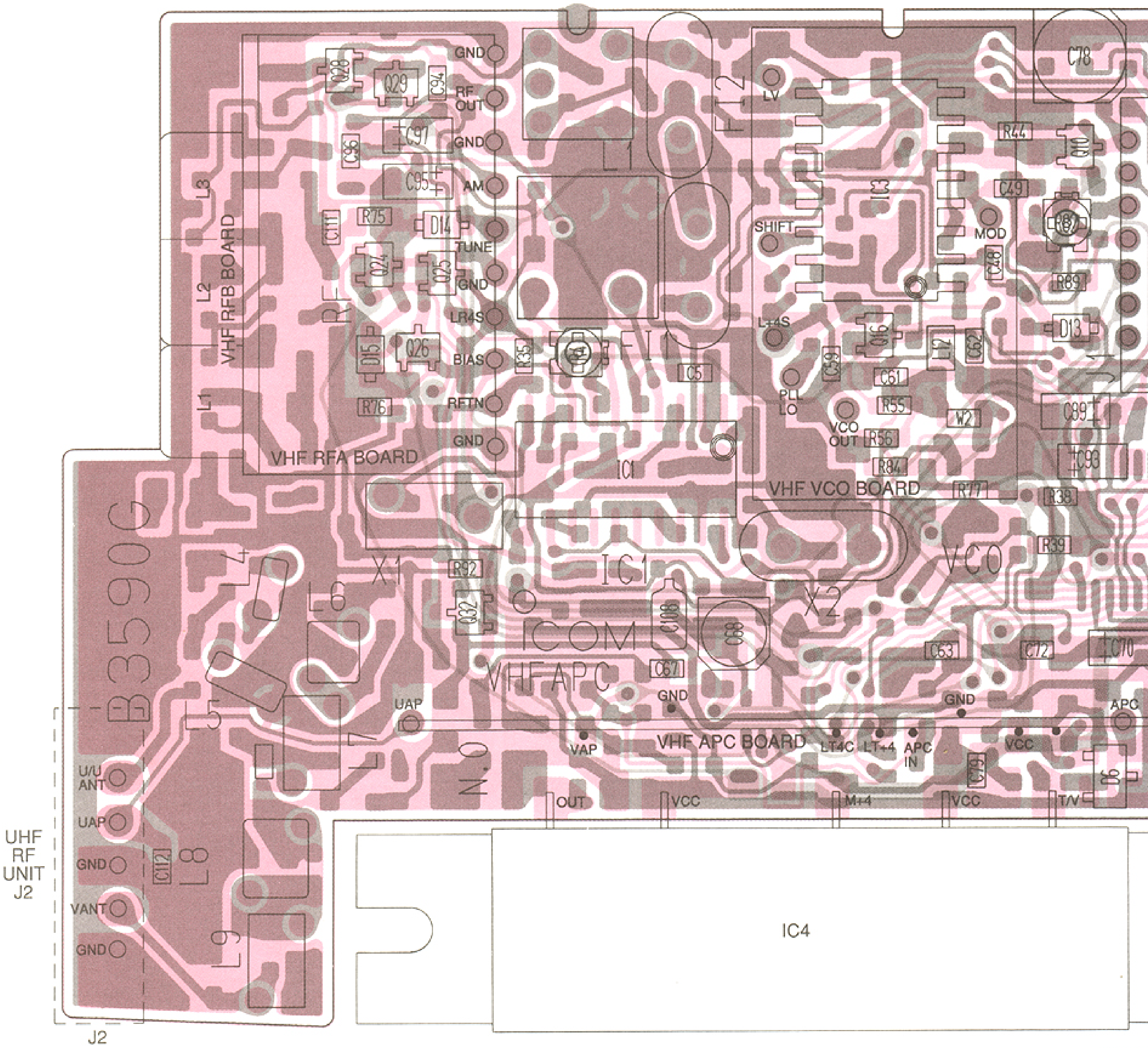
MA132HK
D24 (EUR, USA)
D25 (ITA, USA, AUS, SEA)



Symbol: M3N

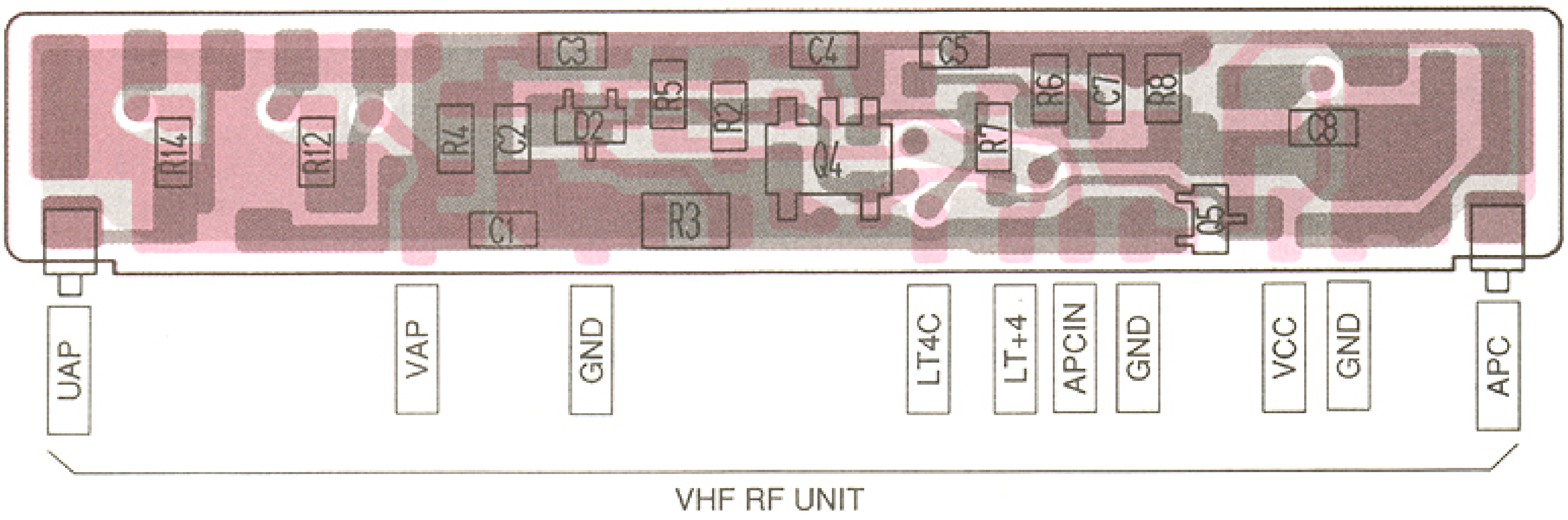
8-3 VHF UNIT

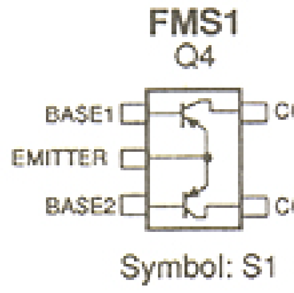
• VHF RF UNIT (TOP VIEW)


GND
RF OUT
GND
AM
TUNE
GND
LR4S
BIAS
RFTN
GND
Q28
Q29
C94
C97
C96
C95
C111
R75
D14
Q24
Q25
D15
Q26
R76
R35
R41
L3
L2
L1
VHF RFB BOARD
VHF RFA BOARD
L1
FL2
FL1
LV
SHIFT
L+4S
PLL LO
VCO OUT
MOD
IC3
C78
R44
Q10
C49
R87
C48
R89
D13
Q16
L12
C62
C59
C61
R55
W2
R56
R84
R77
C89
C93
R38
R39
VHF VCO BOARD
C5
IC1
X1
R92
Q32
IC1
ICOM
VHFAPC
C108
C68
C67
X2
VCO
C63
C72
C70
B3590G
L4
L6
L5
L7
N.0
UAP
GND
VAP
VHF APC BOARD
LT4C
LT+4
APC IN
GND
VCC
APC
C79
Q6
OUT
VCC
M+4
VCC
T/V
U/U ANT
UAP
GND
VANT
GND
C112
L8
L9
UHF RF UNIT J2
J2
IC4

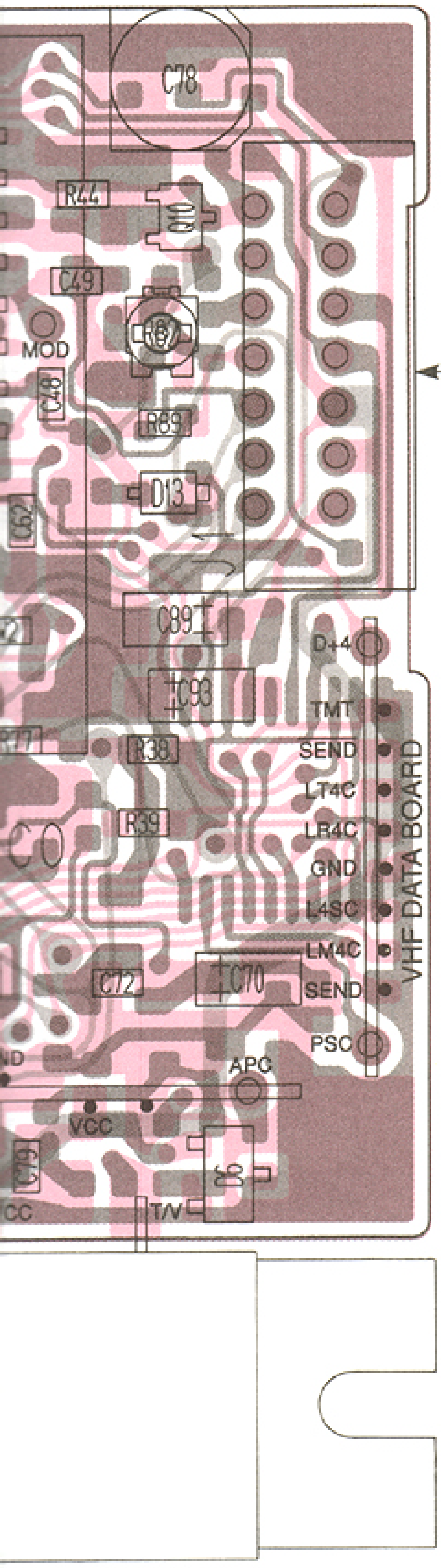
Surface　Inside

• VHF APC BOARD (TOP VIEW)


C3
C4
C5
R14
R12
R4
C2
D2
R5
R2
Q4
R7
R6
C7
R8
C8
Q5
C1
R3
UAP
VAP
GND
LT4C
LT+4
APCIN
GND
VCC
GND
APC
VHF RF UNIT


FMS1
Q4
BASE1
EMITTER
BASE2
Symbol: S1

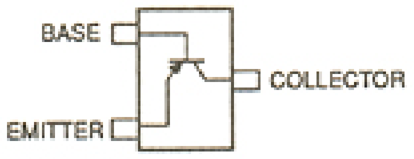
The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.


C78
R44
Q10
C49
R87
MOD
C48
R89
D13
C62
C89
D+4
C93
TMT
R77
R38
SEND
LT4C
R39
LR4C
GND
L4SC
LM4C
C72
C70
SEND
VHF DATA BOARD
PSC
ND
APC
VCC
Q9
C79
CC
T/V

CONNECT UNIT
J1

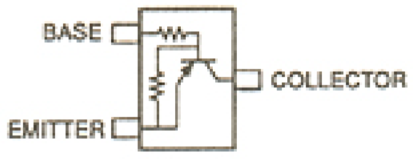
LUL	LCK
+4	LPL STB
LMOD	LIO STB
REF	LDATA
LR4S	VCC
LDET	GND
LSD	+4C

2SA1576
Q10, Q25


BASE
EMITTER
COLLECTOR

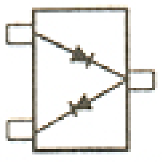
Symbol: FR/FS

DTA144EU
Q28


BASE
EMITTER
COLLECTOR

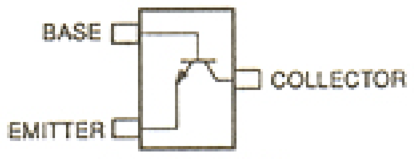
Symbol: 16

1SV172
D6



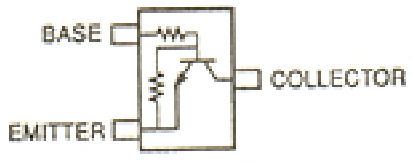
Symbol: BE

2SC4403
Q16


BASE
EMITTER
COLLECTOR

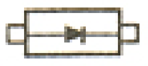
Symbol: LY3

DTC144EU
Q29


BASE
EMITTER
COLLECTOR

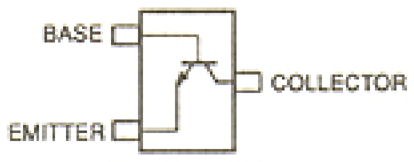
Symbol: 26

MA110
D13 – D15



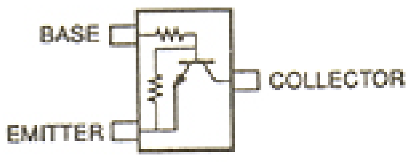
Symbol: 1A

2SC4081
Q24, Q26


BASE
EMITTER
COLLECTOR

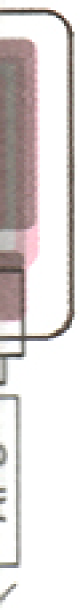
Symbol: BS

DTC114EU
Q32

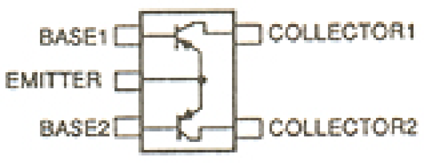

BASE
EMITTER
COLLECTOR

Symbol: 24

▨ Inside ▨ Underside

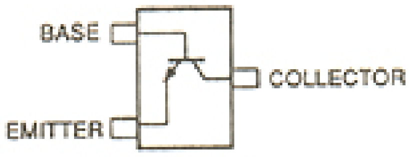


FMS1
Q4


BASE1
EMITTER
BASE2
COLLECTOR1
COLLECTOR2

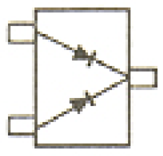
Symbol: S1

2SD2345
Q5


BASE
EMITTER
COLLECTOR

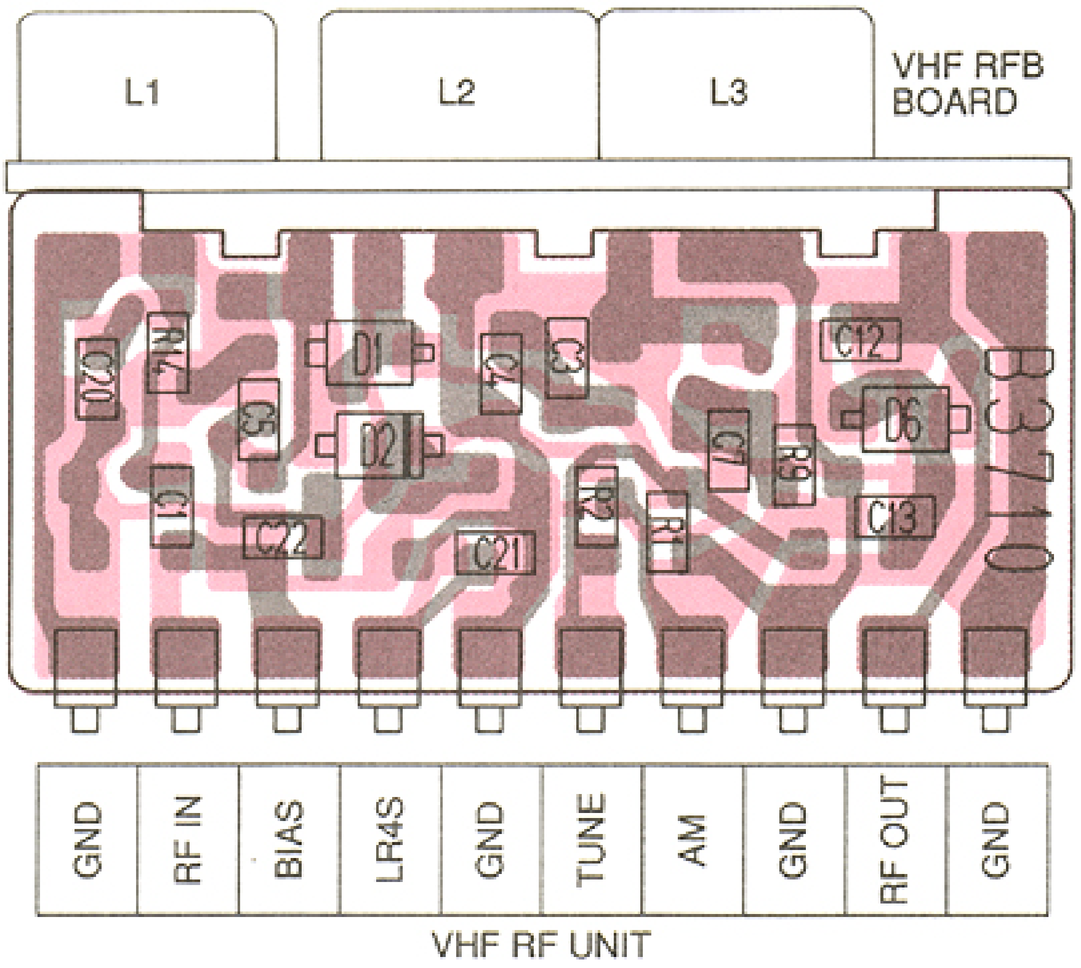
Symbol: 1Z

MA132WK
D2

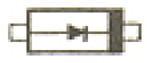


Symbol: MU

• VHF RFA BOARD (TOP VIEW)

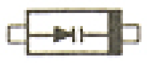

L1
L2
L3
VHF RFB BOARD
C20
R4
D1
C4
C3
C12
C5
D2
C7
R9
D6
C1
C22
C21
R2
R1
C13
B3710
GND
RF IN
BIAS
LR4S
GND
TUNE
AM
GND
RF OUT
GND
VHF RF UNIT

MA77
D1, D6



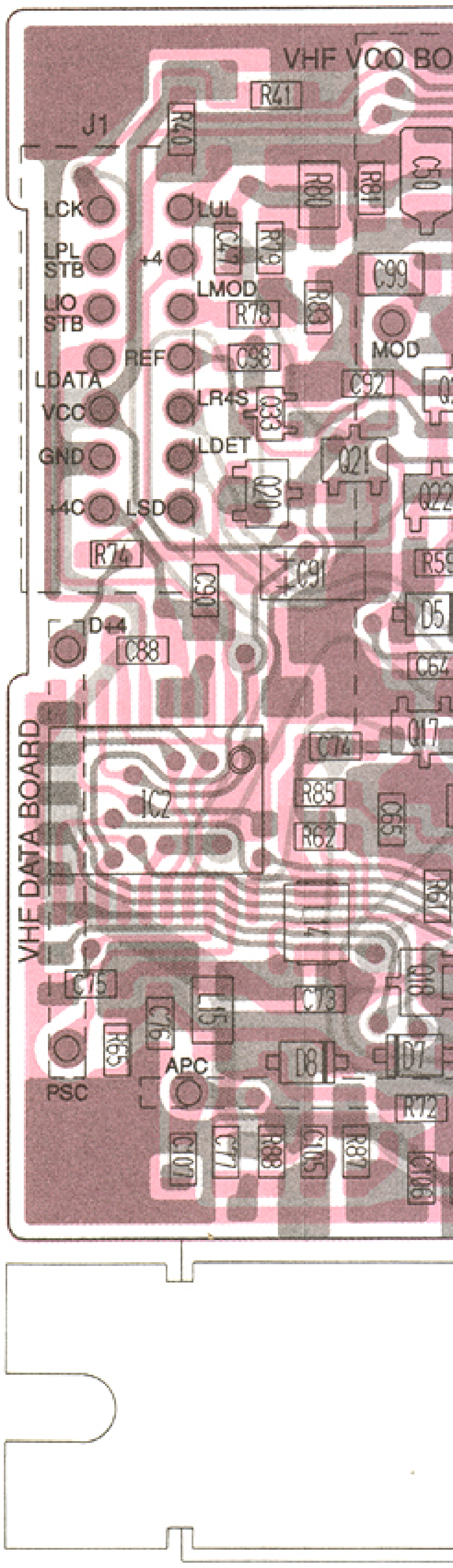
Symbol: 4B

HVU350TRF
D2

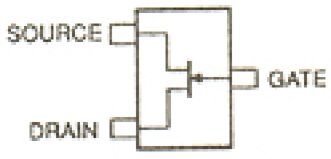


Symbol: 4

• VHF RF UNIT (BOTTOM VIEW

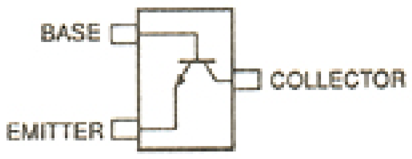

VHF VCO BO
R41
J1
R40
R80
R81
C50
LCK
LUL
C47
R79
LPL STB
+4
LMOD
R78
R83
C99
LIO STB
REF
C98
MOD
C92
LDATA
LR4S
Q33
VCC
LDET
Q21
GND
Q20
Q22
+4C
LSD
R74
C90
C91
R59
D14
C88
D5
C64
VHF DATA BOARD
C74
Q17
IC2
R85
R62
C65
C75
L15
C73
Q18
R65
C76
APC
D8
D7
PSC
R72
C102
C77
R88
C105
R87
C106

2SK882-Y
Q5


SOURCE
GATE
DRAIN

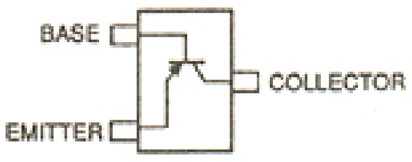
Symbol: TY

2SC4226
Q8, Q9


BASE
COLLECTOR
EMITTER

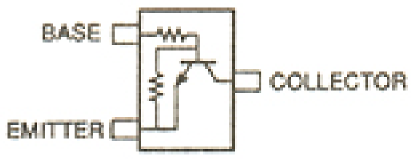
Symbol: R25

2SA1588-GR
Q31


BASE
COLLECTOR
EMITTER

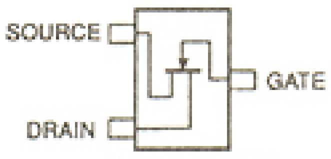
Symbol: ZG

DTC144EU
Q22


BASE
COLLECTOR
EMITTER

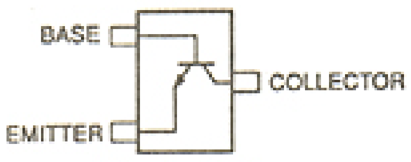
Symbol: 26

2SK880-Y
Q13


SOURCE
GATE
DRAIN

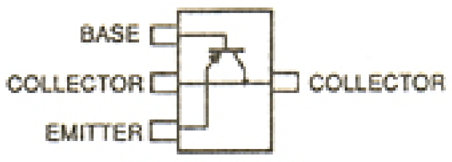
Symbol: XY

2SC4117
Q12


BASE
COLLECTOR
EMITTER

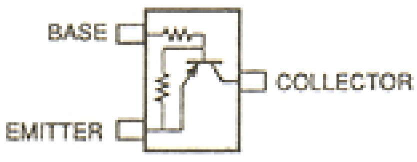
Symbol: CL

2SB798
Q27


BASE
COLLECTOR
COLLECTOR
EMITTER

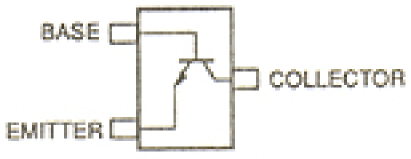
Symbol: DK

DTA143ZU
Q23


BASE
COLLECTOR
EMITTER

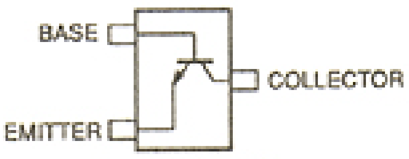
Symbol: 113

2SC4081
Q1, Q2, Q20


BASE
COLLECTOR
EMITTER

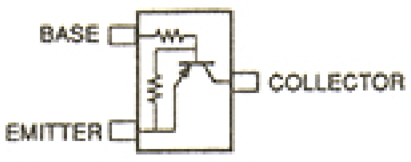
Symbol: BR/BS

2SC4405-3
Q17, Q18


BASE
COLLECTOR
EMITTER

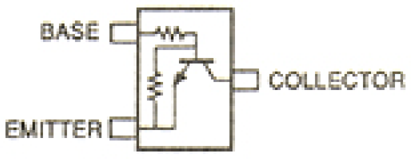
Symbol: OY3

DTA144TU
Q6, Q30


BASE
COLLECTOR
EMITTER

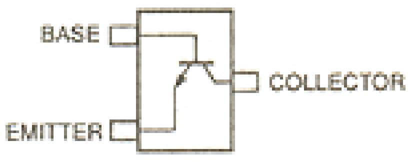
Symbol: 96

UN9211
Q33


BASE
COLLECTOR
EMITTER

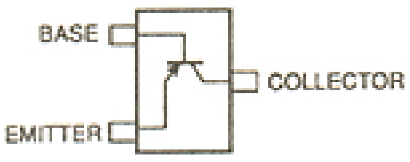
Symbol: 8A

2SC4215
Q4


BASE
COLLECTOR
EMITTER

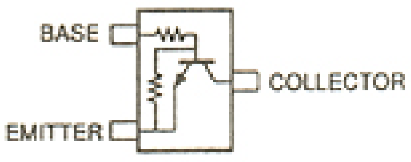
Symbol: QO

2SA1587
Q11


BASE
COLLECTOR
EMITTER

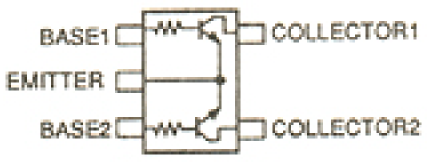
Symbol: DG

DTC114EU
Q14


BASE
COLLECTOR
EMITTER

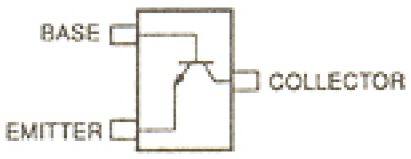
Symbol: 24

XP1210
Q3


BASE1
COLLECTOR1
EMITTER
BASE2
COLLECTOR2

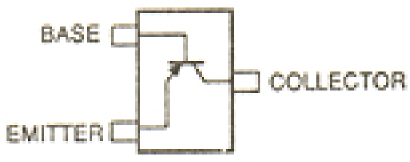
Symbol: AC

2SC4403
Q7, Q15


BASE
COLLECTOR
EMITTER

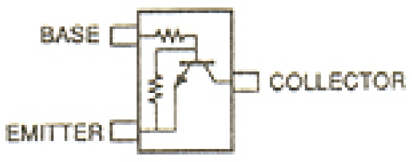
Symbol: LY3

2SA1576
Q21


BASE
COLLECTOR
EMITTER

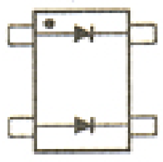
Symbol: FR/FS

UN9115
Q19


BASE
COLLECTOR
EMITTER

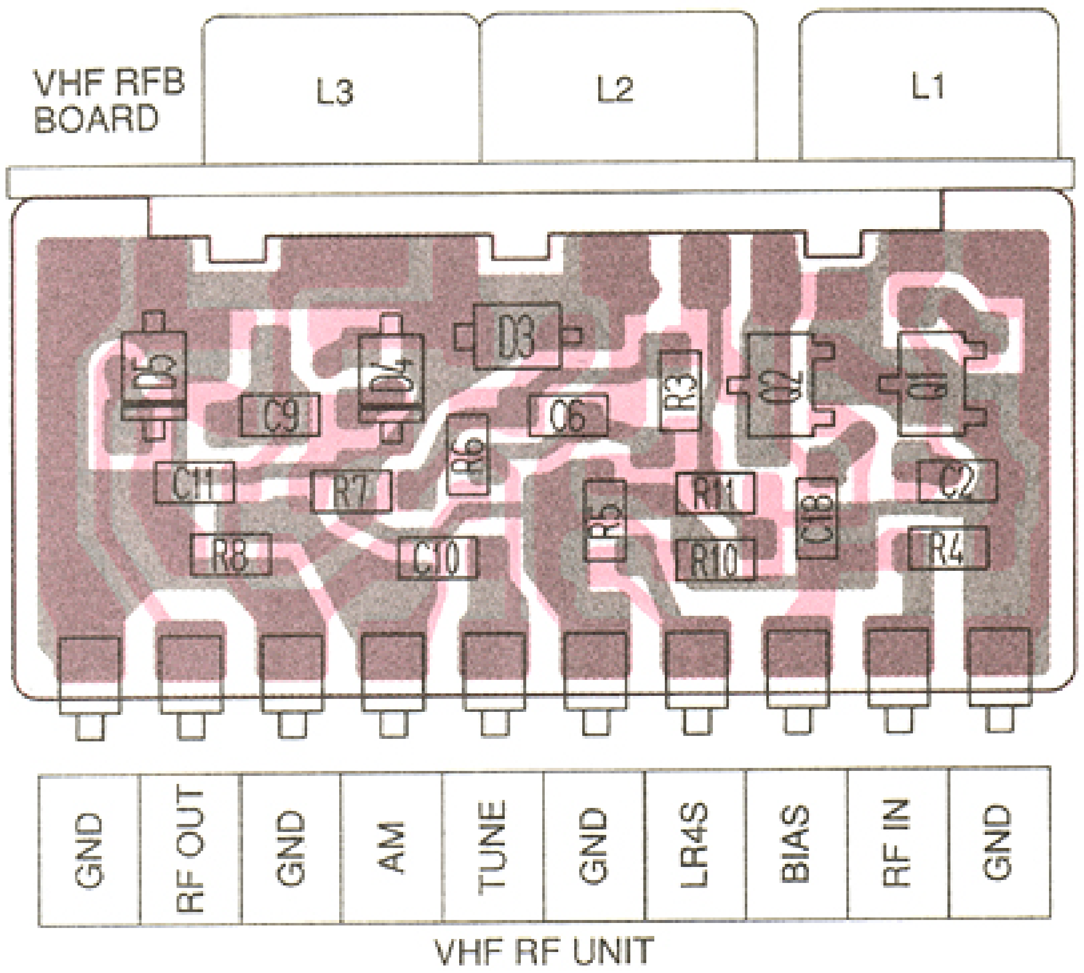
Symbol: 6E/6EH

MA862
D12, D16

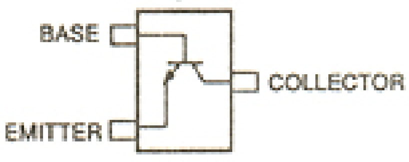


Symbol: M1I

• VHF RFA BOARD (BOTTOM VIEW)

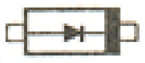

VHF RFB BOARD
L3
L2
L1
D5
D4
D3
R3
Q2
Q1
C9
C6
C11
R7
R6
R5
R11
C18
C2
R8
C10
R10
R4
GND
RF OUT
GND
AM
TUNE
GND
LR4S
BIAS
RF IN
GND
VHF RF UNIT

2SC4405
Q1, Q2


BASE
COLLECTOR
EMITTER

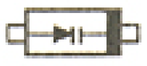
Symbol: OY3

MA77
D3



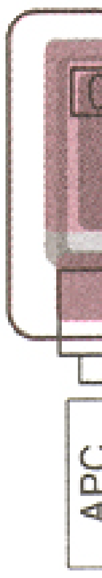
Symbol: 4B

HVU350TRF
D4, D5

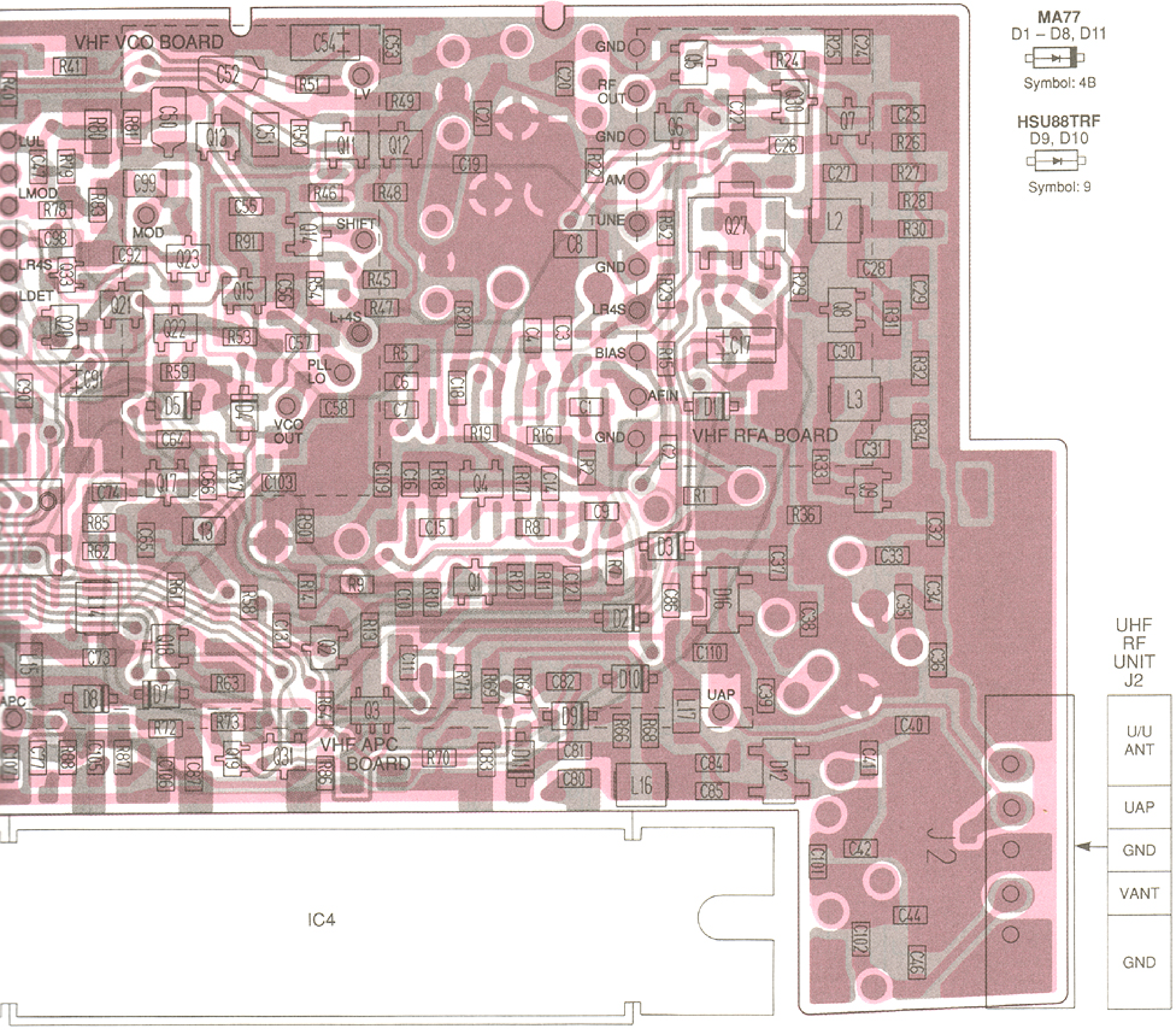


Symbol: 4

• VHI

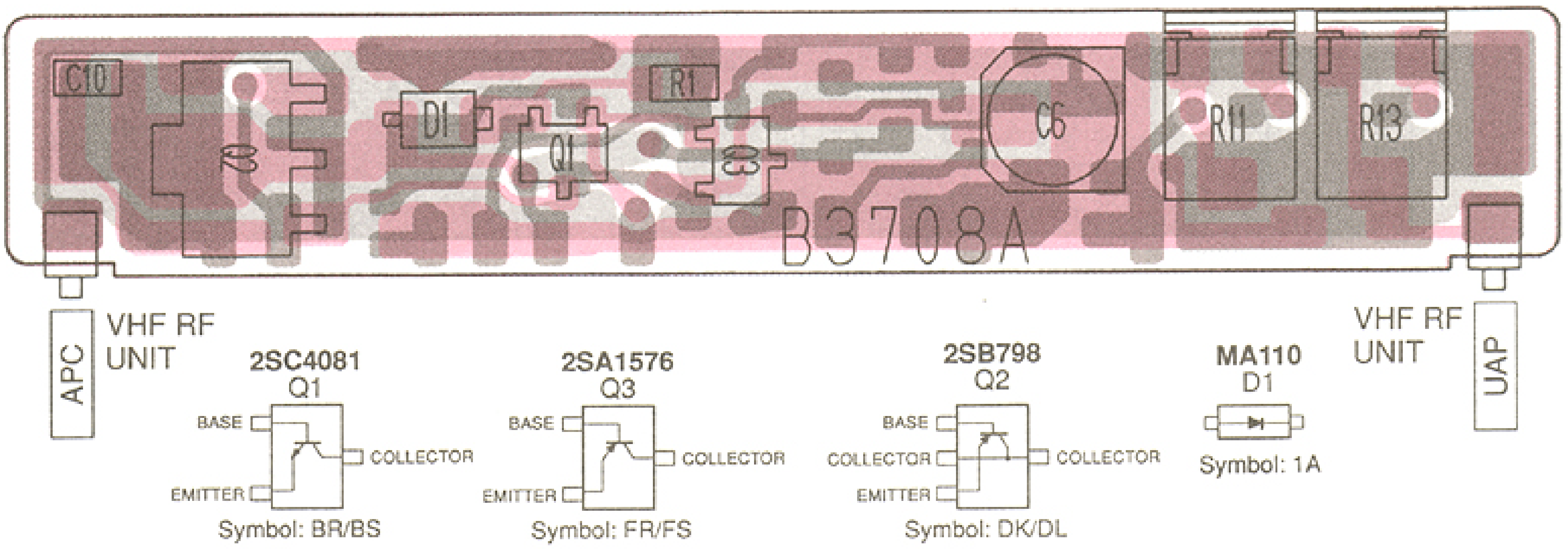


UNIT (BOTTOM VIEW)

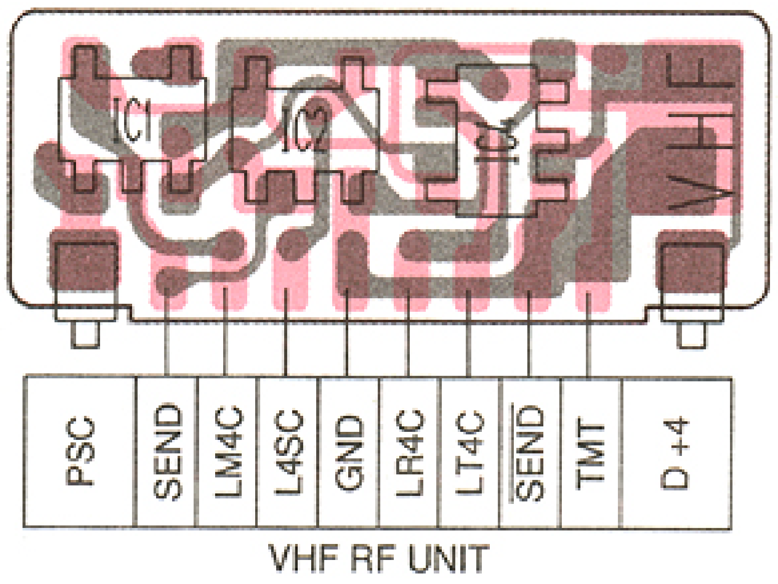

VHF VCO BOARD
VHF RFA BOARD
VHF APC BOARD
IC4
LV
LUL
LMOD
MOD
SHIFT
LR4S
ILDET
L+4S
PLL LO
VCO OUT
APC
GND
RF OUT
GND
AM
TUNE
GND
LR4S
BIAS
AFIN
GND
UAP
J2
MA77
D1 – D8, D11
Symbol: 4B
HSU88TRF
D9, D10
Symbol: 9
UHF RF UNIT J2
U/U ANT
UAP
GND
VANT
GND

▨ Surface ▨ Inside ▨ Underside

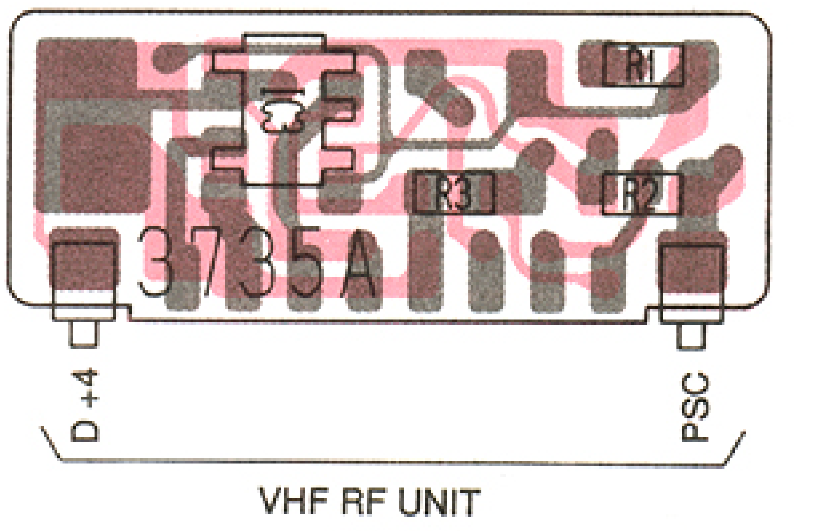
• VHF APC BOARD (BOTTOM VIEW)


C10
Q2
D1
Q1
R1
Q3
C6
R11
R13
B3708A
VHF RF UNIT
APC
VHF RF UNIT
UAP
2SC4081
Q1
BASE
COLLECTOR
EMITTER
Symbol: BR/BS
2SA1576
Q3
BASE
COLLECTOR
EMITTER
Symbol: FR/FS
2SB798
Q2
BASE
COLLECTOR
COLLECTOR
EMITTER
Symbol: DK/DL
MA110
D1
Symbol: 1A

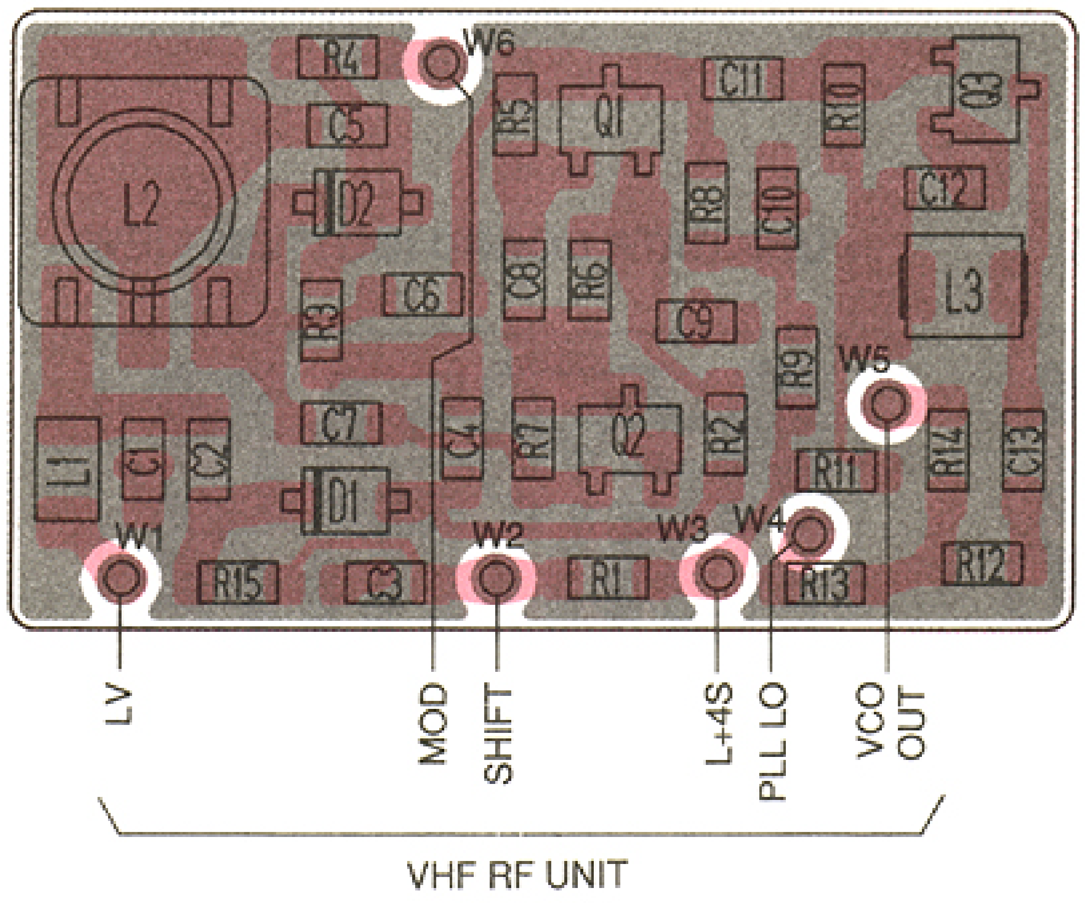
• VHF DATA BOARD (TOP VIEW)


IC1
IC2
IC4
VHF
PSC
SEND
LM4C
L4SC
GND
LR4C
LT4C
$\overline{\text{SEND}}$
TMT
D +4
VHF RF UNIT

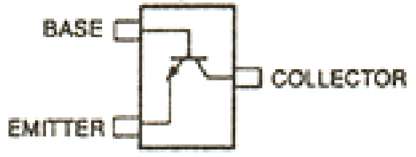
• VHF DATA BOARD (BOTTOM VIEW)


R1
R3
R2
3735A
D +4
PSC
VHF RF UNIT

• VHF VCO BOARD (TOP VIEW)

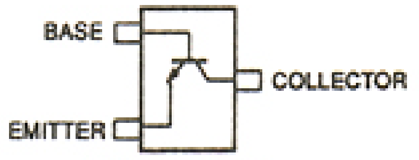

R4
W6
C5
R5
Q1
C11
R10
Q3
L2
D2
R8
C10
C12
R3
C6
C8
R6
C9
L3
R9
W5
C7
C4
R7
Q2
R2
R11
R14
C13
L1
C1
C2
D1
W1
W2
W3
W4
R15
C3
R1
R13
R12
LV
MOD
SHIFT
L+4S
PLL LO
VCO OUT
VHF RF UNIT

2SC4226
Q1, Q2


BASE
COLLECTOR
EMITTER

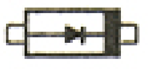
Symbol: R25

2SC4403
Q3


BASE
COLLECTOR
EMITTER

Symbol: LY3

MA77
D1



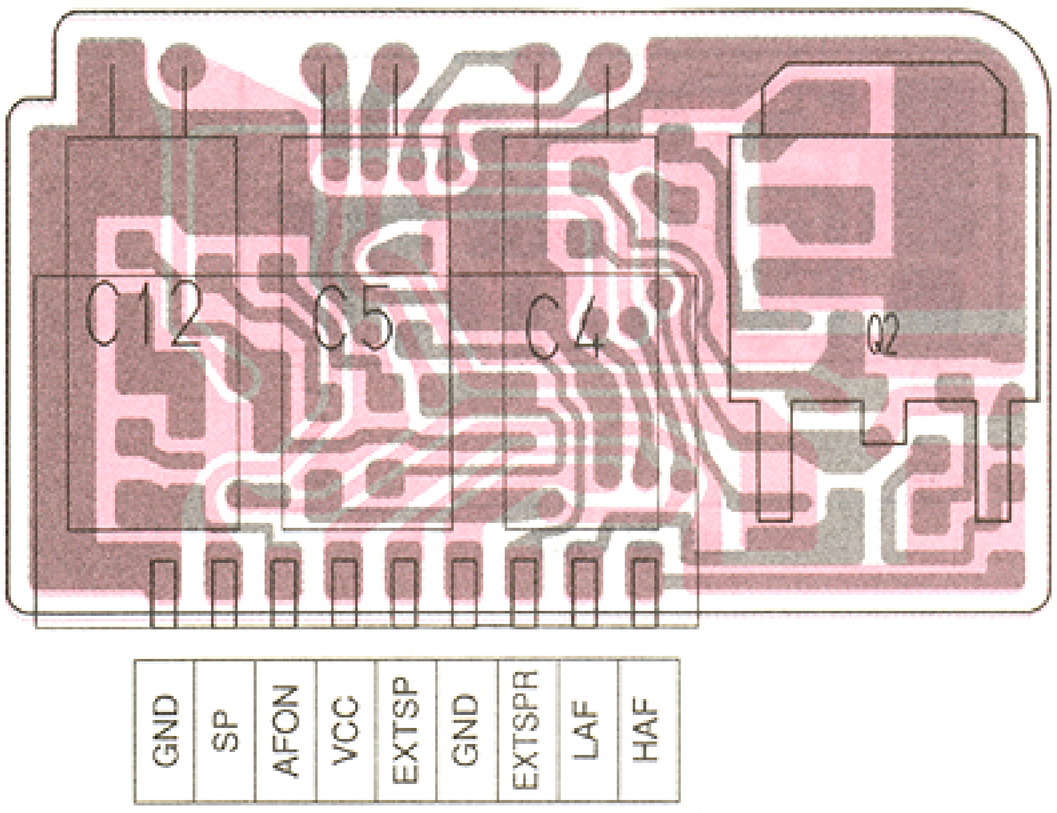
Symbol: 4B

HVU350TRF
D2

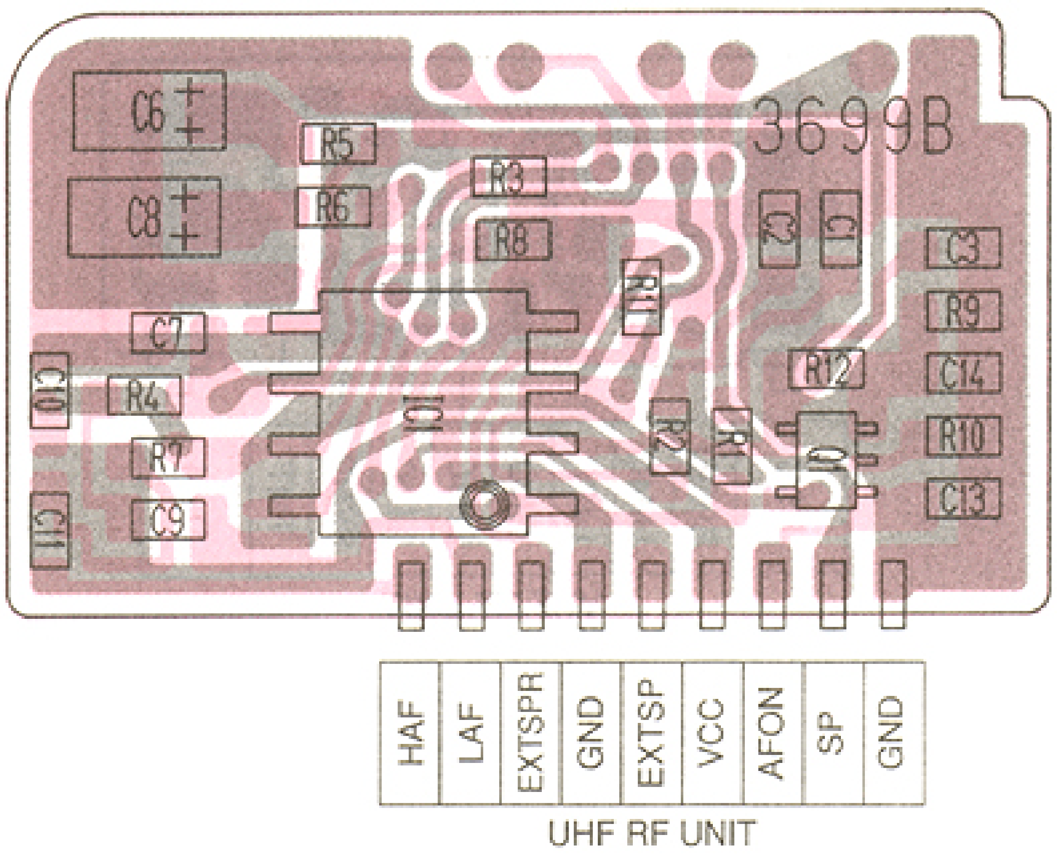
Symbol: 4

8-4 UHF RF UNIT

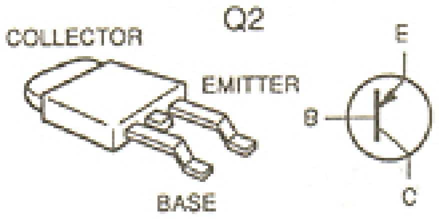
• AF BOARD (TOP VIEW)


C12
C5
C4
Q2
GND
SP
AFON
VCC
EXTSP
GND
EXTSPR
LAF
HAF
UHF RF UNIT

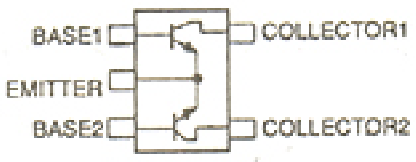
• AF BOARD (BOTTOM VIEW)


C6
C8
R5
R6
R3
R8
3699B
C2
C1
C3
R9
C14
R10
C13
R11
R12
C7
C10
R4
R7
C9
C11
IC1
R2
R1
Q1
HAF
LAF
EXTSPR
GND
EXTSP
VCC
AFON
SP
GND
UHF RF UNIT

2SB1182
Q2

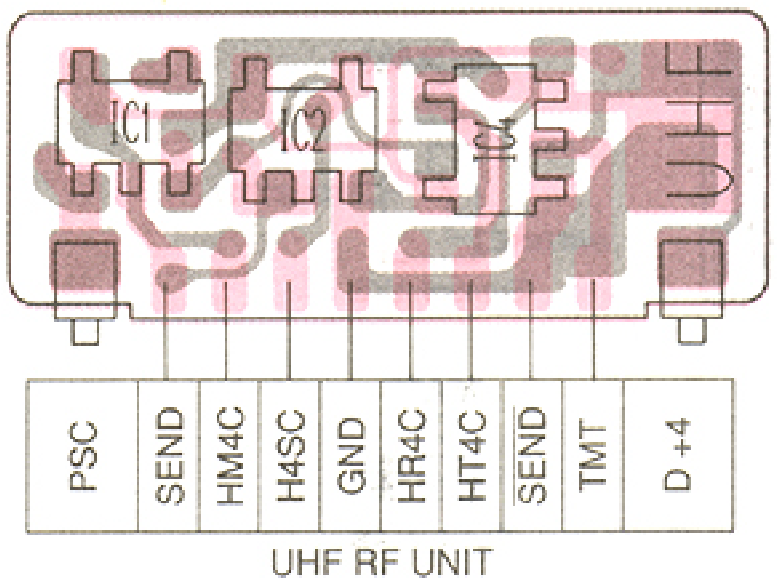

COLLECTOR
EMITTER
BASE
E
B
C

XP1501
Q1

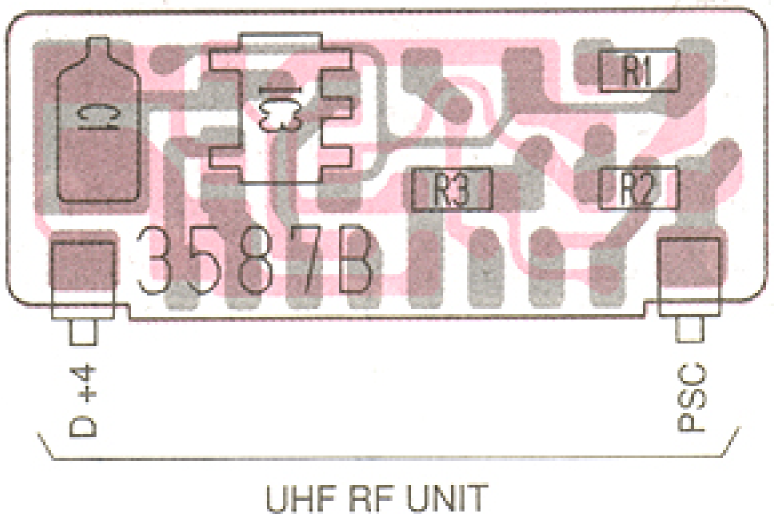

BASE1
EMITTER
BASE2
COLLECTOR1
COLLECTOR2

Symbol: 5R

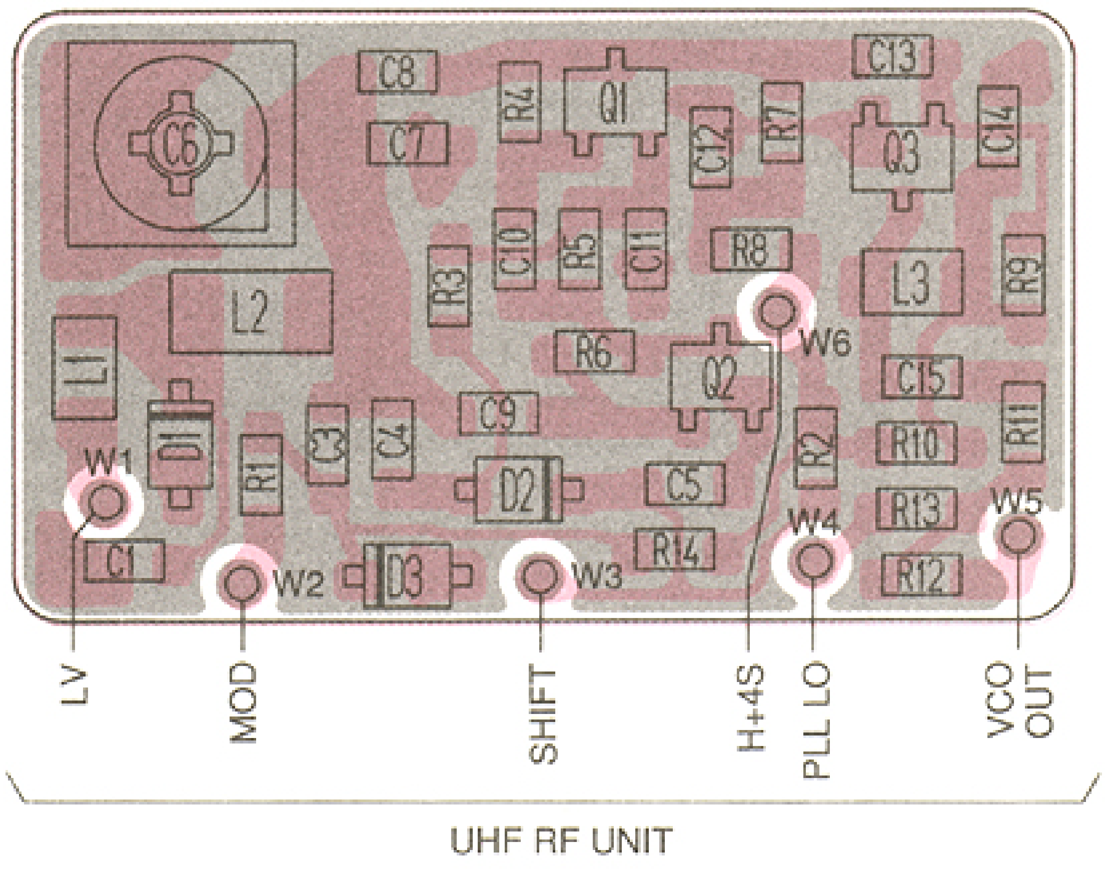
• UHF DATA BOARD (TOP VIEW)


IC1
IC2
IC4
UHF
PSC
SEND
HM4C
H4SC
GND
HR4C
HT4C
SEND
TMT
D +4
UHF RF UNIT

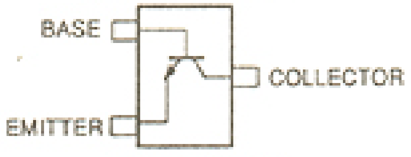
• UHF DATA BOARD (BOTTOM VIEW)


C1
IC3
R1
R3
R2
3587B
D +4
PSC
UHF RF UNIT

• UHF VCO BOARD (TOP VIEW)

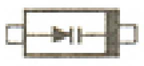

C6
C8
C7
R4
Q1
C12
R7
C13
Q3
C14
C10
R5
C11
R8
L3
R9
L2
R3
R6
W6
L1
Q2
C15
D1
C9
R11
R10
W1
R1
C3
C4
D2
C5
R2
R13
W5
C1
W2
D3
W3
R14
W4
R12
LV
MOD
SHIFT
H+4S
PLL LO
VCO OUT
UHF RF UNIT

2SC4226
Q1, Q2, Q3


BASE
COLLECTOR
EMITTER

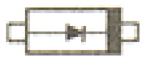
Symbol: R25

HVU350TRF
D1



Symbol: 4

MA77
D2

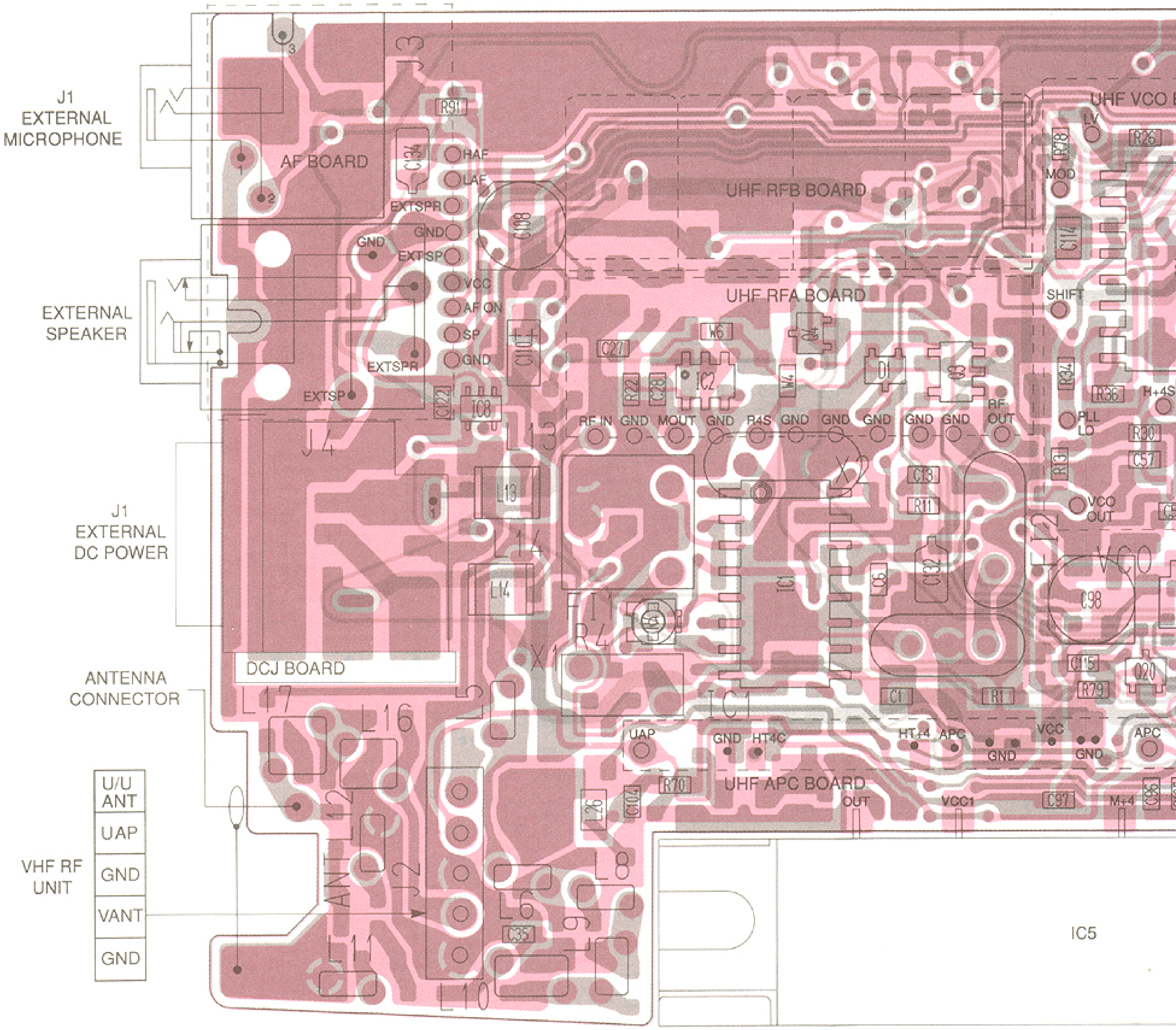


Symbol: 4B

MA363B
D3

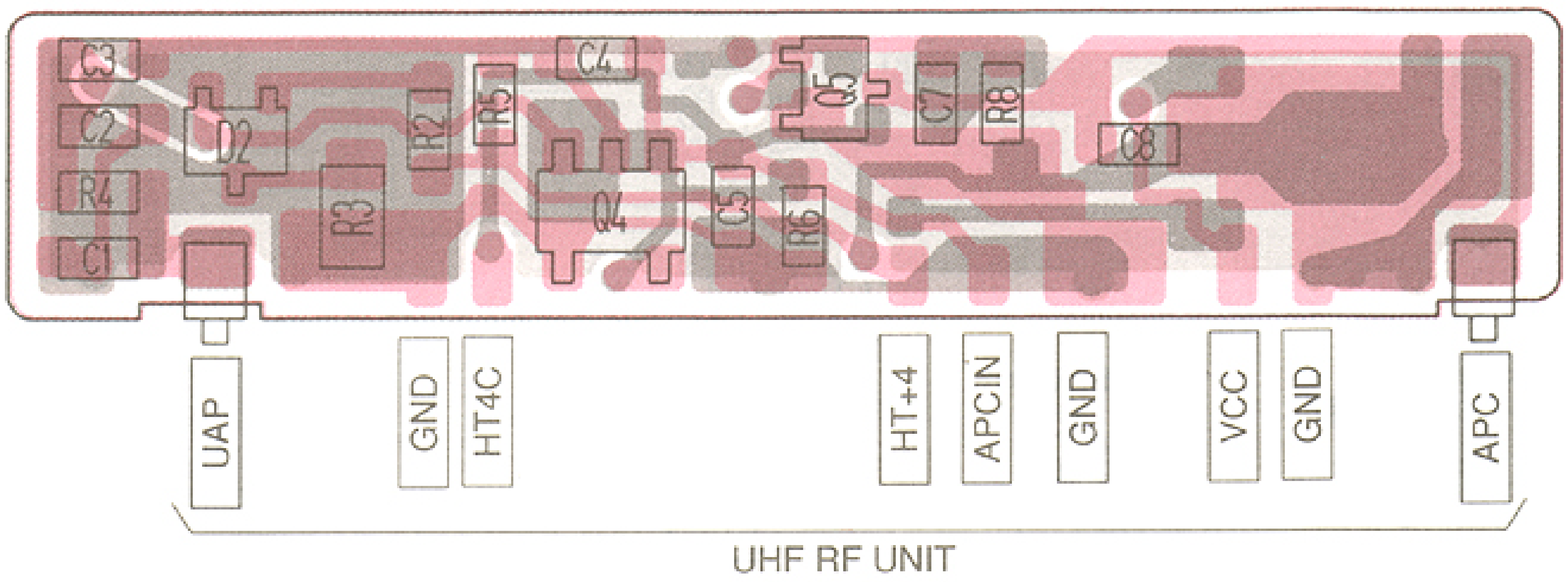
Symbol: 6D

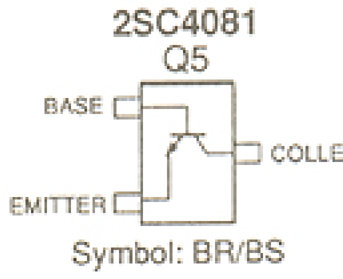
• UHF RF UNIT (TOP VIEW)

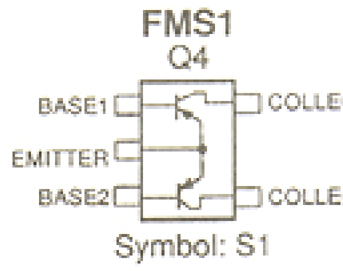

J1
EXTERNAL
MICROPHONE
EXTERNAL
SPEAKER
J1
EXTERNAL
DC POWER
ANTENNA
CONNECTOR
VHF RF
UNIT
U/U
ANT
UAP
GND
VANT
GND
AF BOARD
J3
R91
C94
HAF
LAF
EXTSPR
GND
GND
EXT SP
VCC
AF ON
SP
GND
EXTSPR
EXTSP
C108
C104
C121
IC8
L13
J4
L14
DCJ BOARD
L17
L16
ANT
J2
L11
L10
L6
L9
L8
C35
L26
C104
UHF RFB BOARD
UHF RFA BOARD
W6
C27
Q4
IC2
R22
C28
W4
D1
Q3
RF IN
GND
MOUT
GND
R4S
GND
GND
GND
GND
GND
RF
OUT
X2
C13
R11
IC1
C6
C132
X1
FI1
R4
L5
UAP
GND
HT4C
HT+4
APC
GND
VCC
GND
APC
UHF APC BOARD
R70
OUT
VCC1
C97
M+4
C96
UHF VCO
LV
R26
R78
MOD
C114
SHIFT
R34
R36
H+4S
PLL
LO
R30
R13
C57
VCO
OUT
L12
VCO
C98
C115
R79
Q20
C1
R1
IC5

🟥 Surface

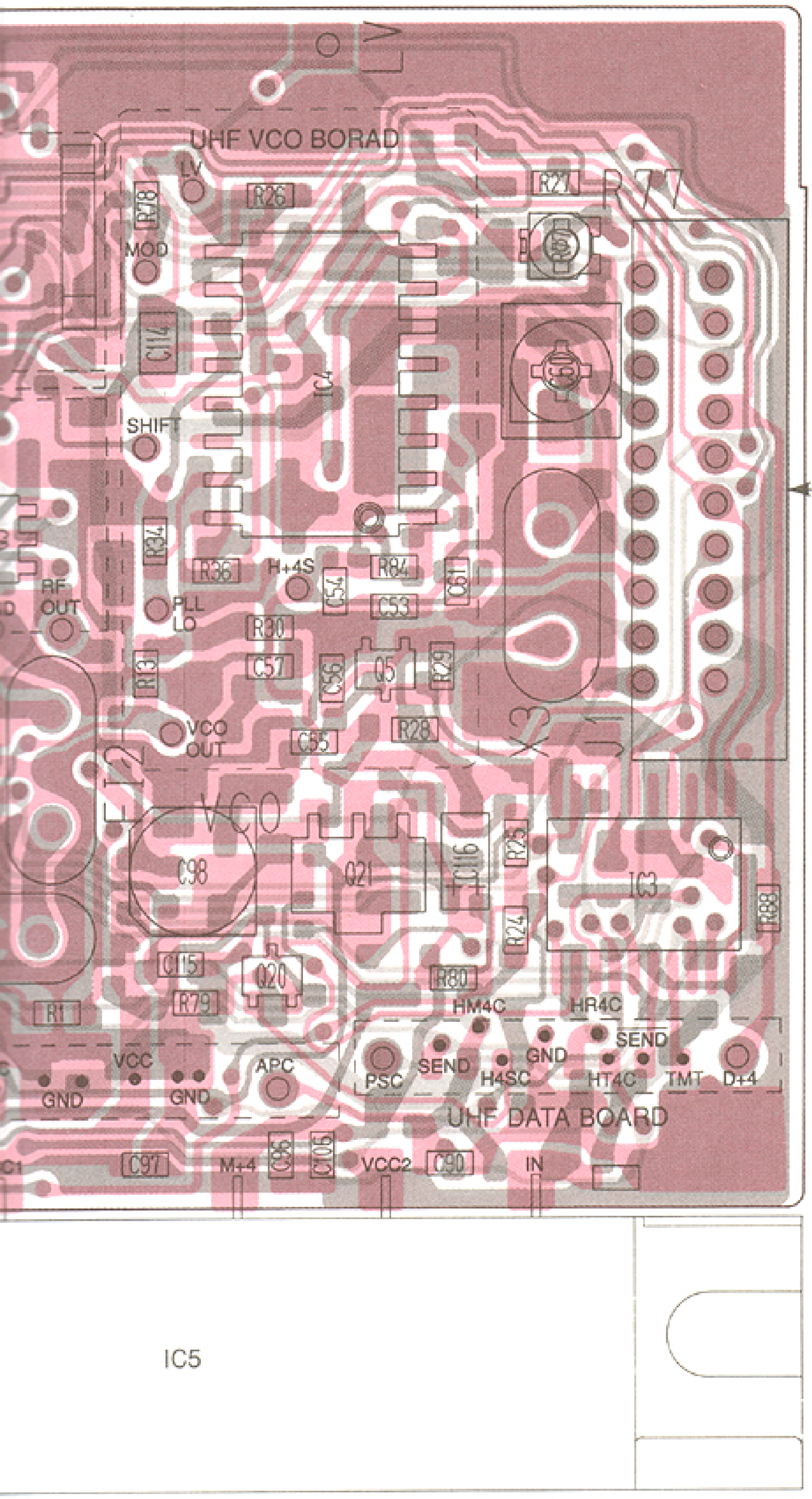
• UHF APC BOARD (TOP VIEW)


C3
C2
R4
C1
D2
R3
R2
R5
C4
Q4
C5
R6
Q5
C7
R8
C8
UAP
GND
HT4C
HT+4
APCIN
GND
VCC
GND
APC
UHF RF UNIT


2SC4081
Q5
BASE
EMITTER
COLLE
Symbol: BR/BS


FMS1
Q4
BASE1
EMITTER
BASE2
COLLE
COLLE
Symbol: S1

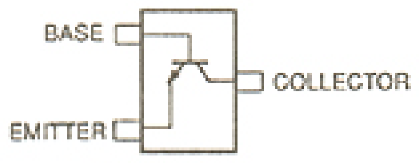
The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.


UHF VCO BORAD
LV
R26
R27
R77
R78
MOD
C114
IC4
SHIFT
R34
R36
H+4S
R84
C54
C61
RF OUT
PLL LO
R30
C53
R13
C57
C56
Q5
R29
VCO OUT
C55
R28
X2
VCO
C98
Q21
C116
R25
IC3
R88
R24
C115
Q20
R79
R80
R1
HM4C
HR4C
SEND
VCC
GND
GND
APC
PSC
SEND
H4SC
GND
HT4C
TMT
D+4
UHF DATA BOARD
C97
M+4
C96
C106
VCC2
C90
IN
IC5

CONNECT UNIT J2

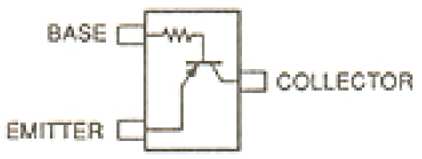
HPL STB	AF ON
EXT MIC	LAF
SP	HAF
HMOD	+4
HUL	HCK
HR4S	HDATA
VCC	HIO STB
REF	+4C
HDET	⊖
HSD	GND

2SC4117
Q5


BASE
EMITTER
COLLECTOR

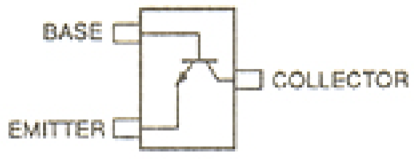
Symbol: CL

DTA114TU
Q4


BASE
EMITTER
COLLECTOR

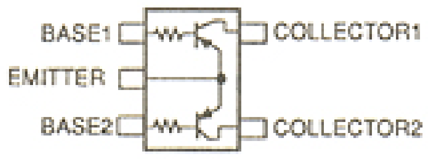
Symbol: 94

2SC4081
Q20


BASE
EMITTER
COLLECTOR

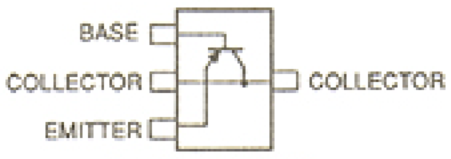
Symbol: BR/BS

FMA4
Q3


BASE1
EMITTER
BASE2
COLLECTOR1
COLLECTOR2

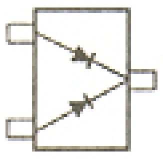
Symbol: A4

2SB798
Q21


BASE
COLLECTOR
EMITTER
COLLECTOR

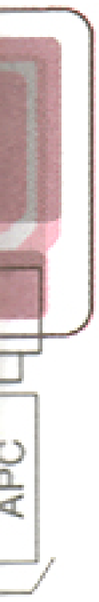
Symbol: DK/DL

DAN202U
D1

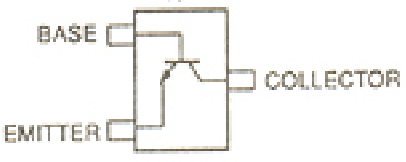


Symbol: N

🟥 Surface ▨ Inside ▨ Underside

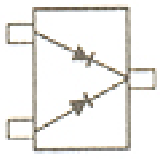


2SC4081
Q5


BASE
EMITTER
COLLECTOR

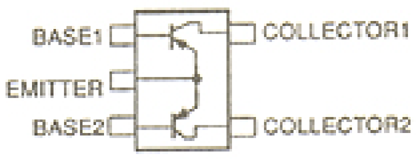
Symbol: BR/BS

DAN202U
D2



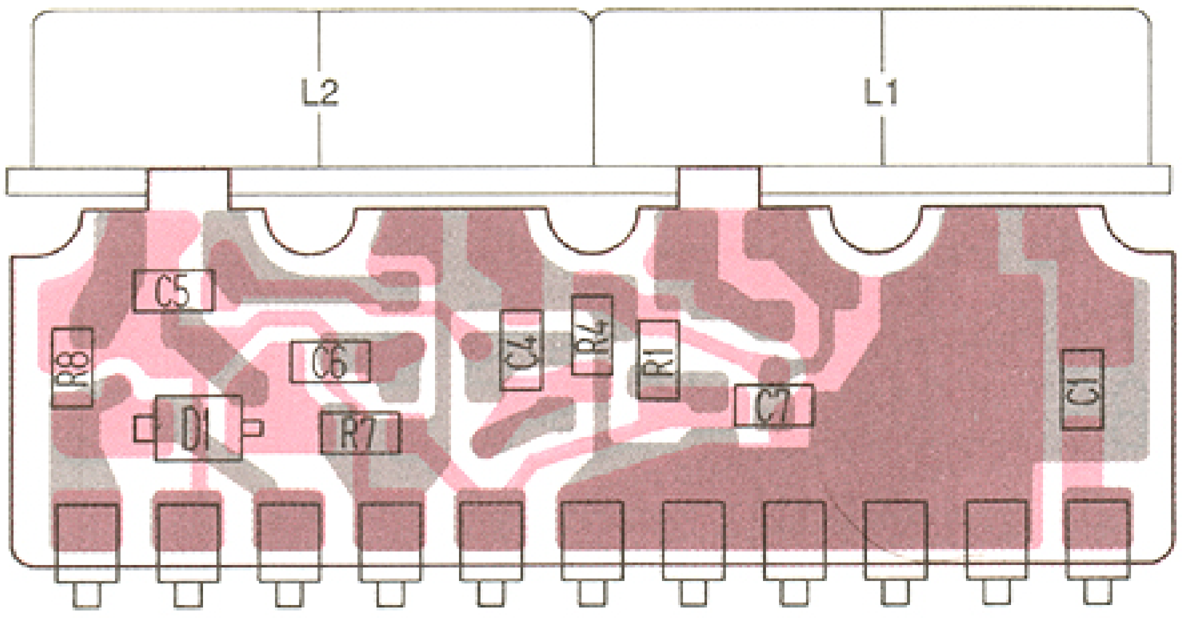
Symbol: N

FMS1
Q4


BASE1
EMITTER
BASE2
COLLECTOR1
COLLECTOR2

Symbol: S1

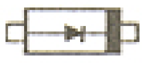
• UHF RFA BOARD (TOP VIEW)


L2
L1
C5
C6
C4
R4
R1
C7
C1
R8
D1
R7

RF IN	GND	MOUT	GND	R4S	GND	GND	GND	GND	GND	RF OUT

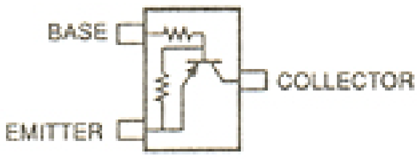
UHF RF UNIT

MA77
D1



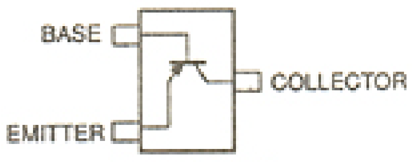
Symbol: 4B

DTA143ZU
Q7


BASE
COLLECTOR
EMITTER

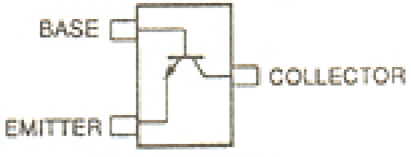
Symbol: 113

2SA1587
Q9


BASE
COLLECTOR
EMITTER

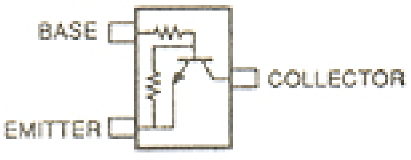
Symbol: DG

2SC4226
Q11, Q13, Q15


BASE
COLLECTOR
EMITTER

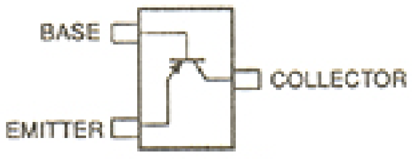
Symbol: R25

DTC144EU
Q8, Q12, Q25


BASE
COLLECTOR
EMITTER

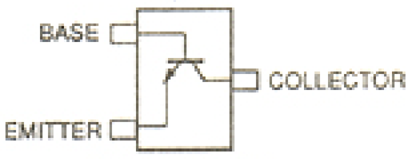
Symbol: 24

2SA1588
Q14


BASE
COLLECTOR
EMITTER

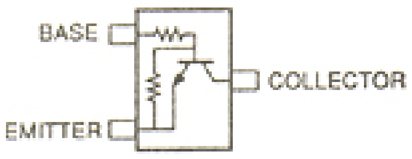
Symbol: ZG

2SC3356
Q16


BASE
COLLECTOR
EMITTER

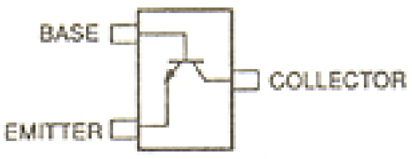
Symbol: R25

UN9115
Q17


BASE
COLLECTOR
EMITTER

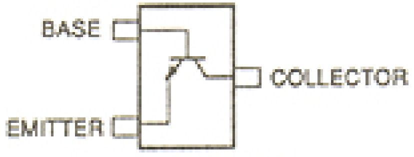
Symbol: 6EH

2SC4215
Q1


BASE
COLLECTOR
EMITTER

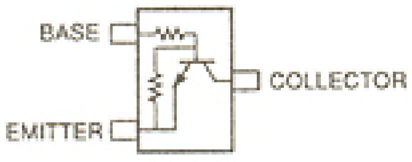
Symbol: QO/QY

2SC4081
Q18, Q22


BASE
COLLECTOR
EMITTER

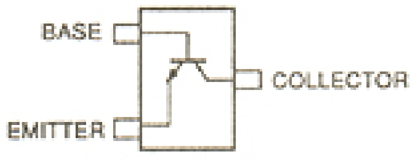
Symbol: BR/BS

UN9211
Q30


BASE
COLLECTOR
EMITTER

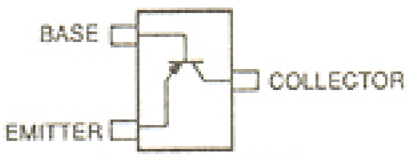
Symbol: 8A

2SC4403
Q2


BASE
COLLECTOR
EMITTER

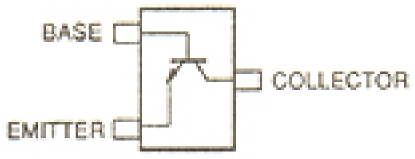
Symbol: LY3

2SA1576
Q6, Q19,
Q23


BASE
COLLECTOR
EMITTER

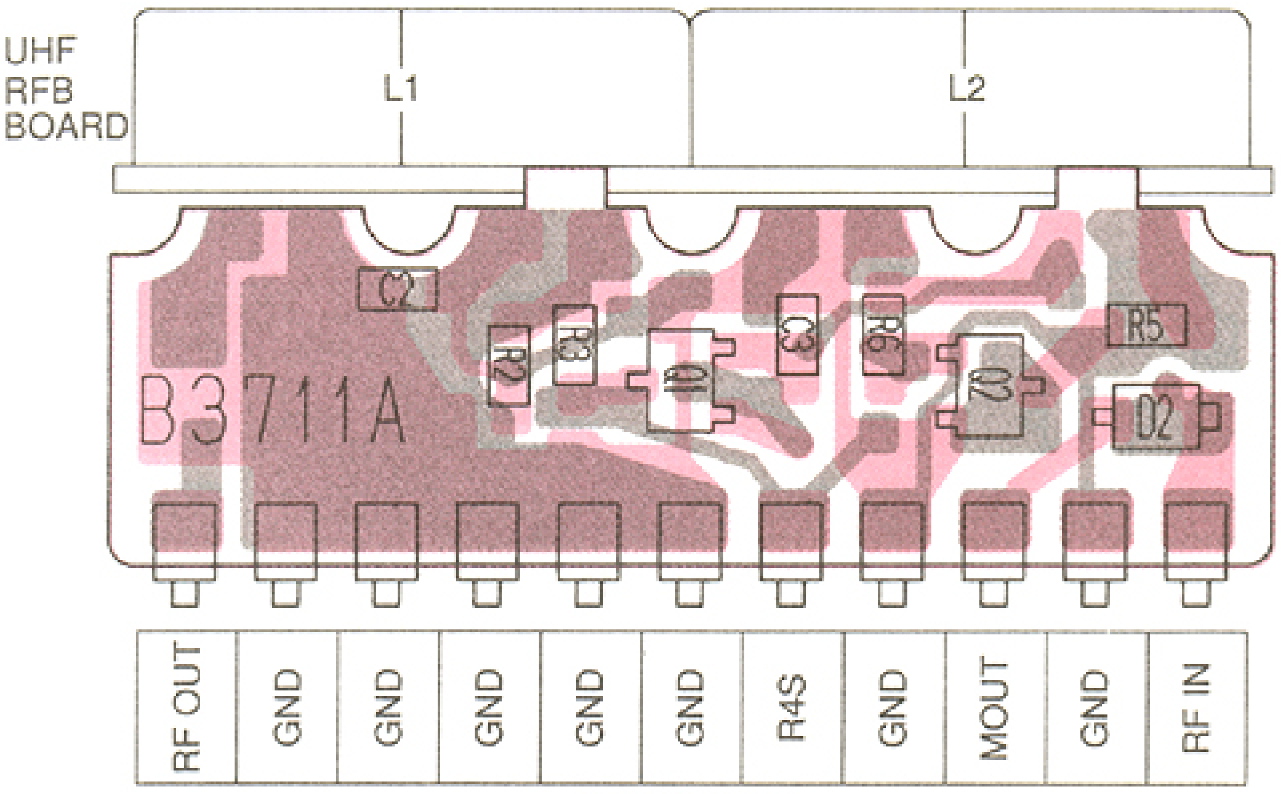
Symbol: FR/FS

2SC4117
Q10


BASE
COLLECTOR
EMITTER

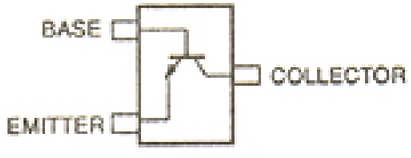
Symbol: CL

• UHF RFA BOARD (BOTTOM VIEW)


UHF
RFB
BOARD
L1
L2
C2
R2
R3
Q1
C3
R6
Q2
R5
D2
B3711A
RF OUT
GND
GND
GND
GND
GND
R4S
GND
MOUT
GND
RF IN

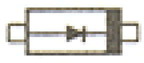
UHF RF UNIT

2SC4228
Q1, Q2


BASE
COLLECTOR
EMITTER

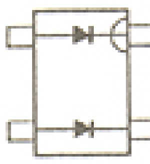
Symbol: R44

MA77
D2



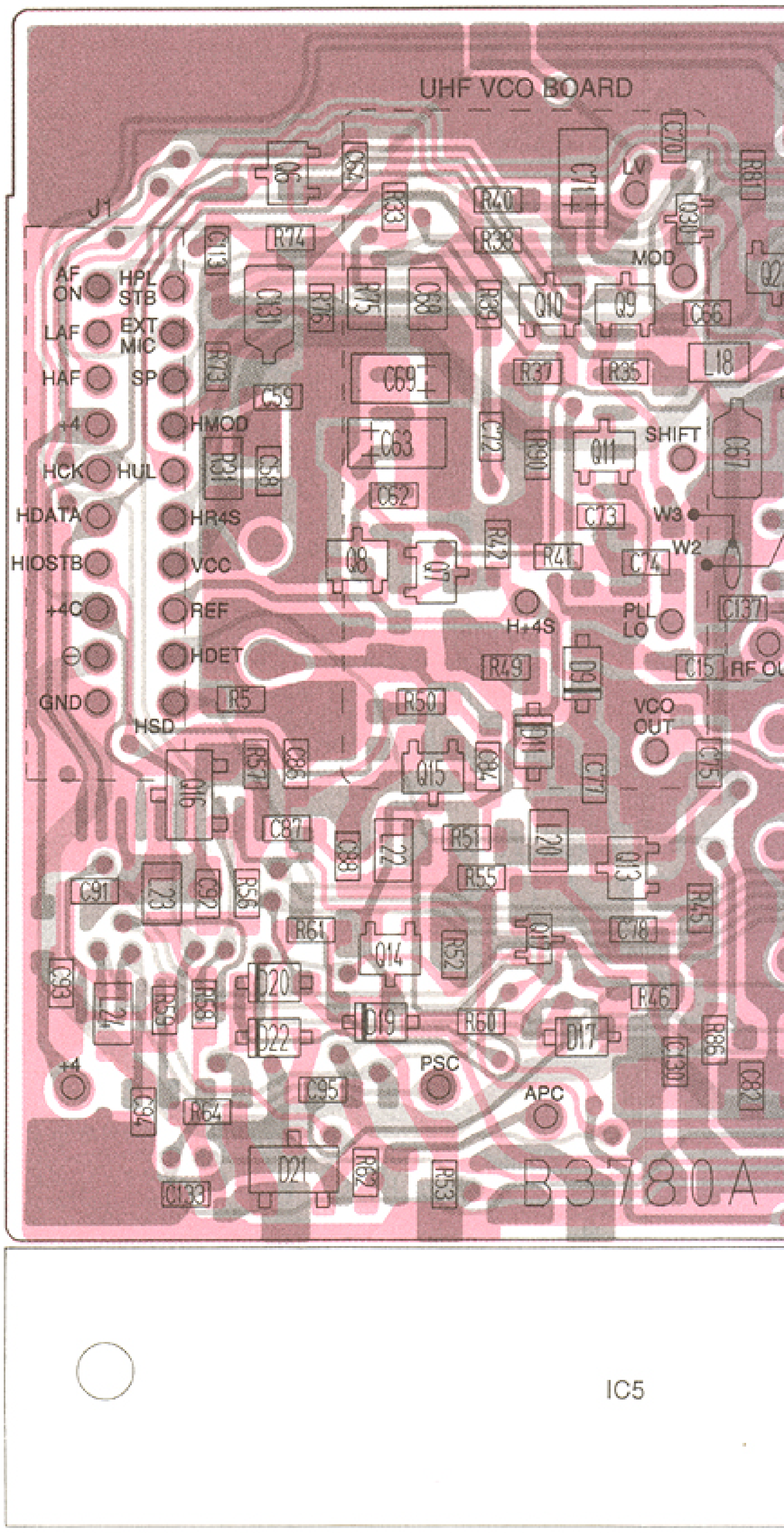
Symbol: 4B

MA862
D15



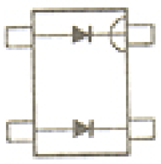
Symbol: M1

• UHF RF UNIT (BOTTOM VIEW)


UHF VCO BOARD
J1
AF ON
LAF
HAF
+4
HCK
HDATA
HIOSTB
+4C
⊖
GND
HPL STB
EXT MIC
SP
HMOD
HUL
HR4S
VCC
REF
HDET
HSD
MOD
LV
SHIFT
W3
W2
H+4S
PLL LO
RF OU
VCO OUT
PSC
APC
+4
Q6
C64
R33
R40
R38
C71
C70
R81
Q30
R74
C113
Q31
R76
R75
C68
R39
Q10
Q9
C66
L18
R73
C69
R37
R35
C59
C63
C72
R90
Q11
C67
D31
C58
C62
C73
Q8
Q7
R42
R41
C74
C137
R49
D9
C15
R5
R50
D11
Q16
R57
C86
Q15
C84
C77
C75
C87
C88
L22
R51
L20
Q13
C91
L23
C92
R56
R55
R45
R61
Q14
R52
Q12
C78
C93
L24
R59
R58
D20
D19
R60
D17
R46
R86
C130
C82
D22
C95
C94
R64
D21
R62
R53
C133
B3780A
IC5

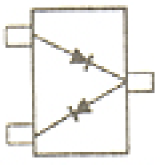
▨ Surface ▨ Inside ▨ Underside

MA862
D15



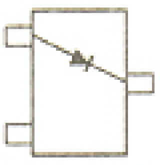
Symbol: M1I

1SV172
D21



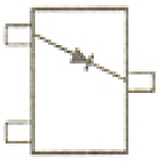
Symbol: BE

DA114
D18



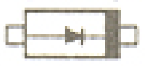
Symbol: AV

SB30-03P
D23



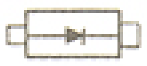
Symbol: SC

MA77
D5, D6, D8,
D9, D11, D19,
D20, D22, D24



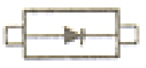
Symbol: 4B

MA110
D14, D16, D17

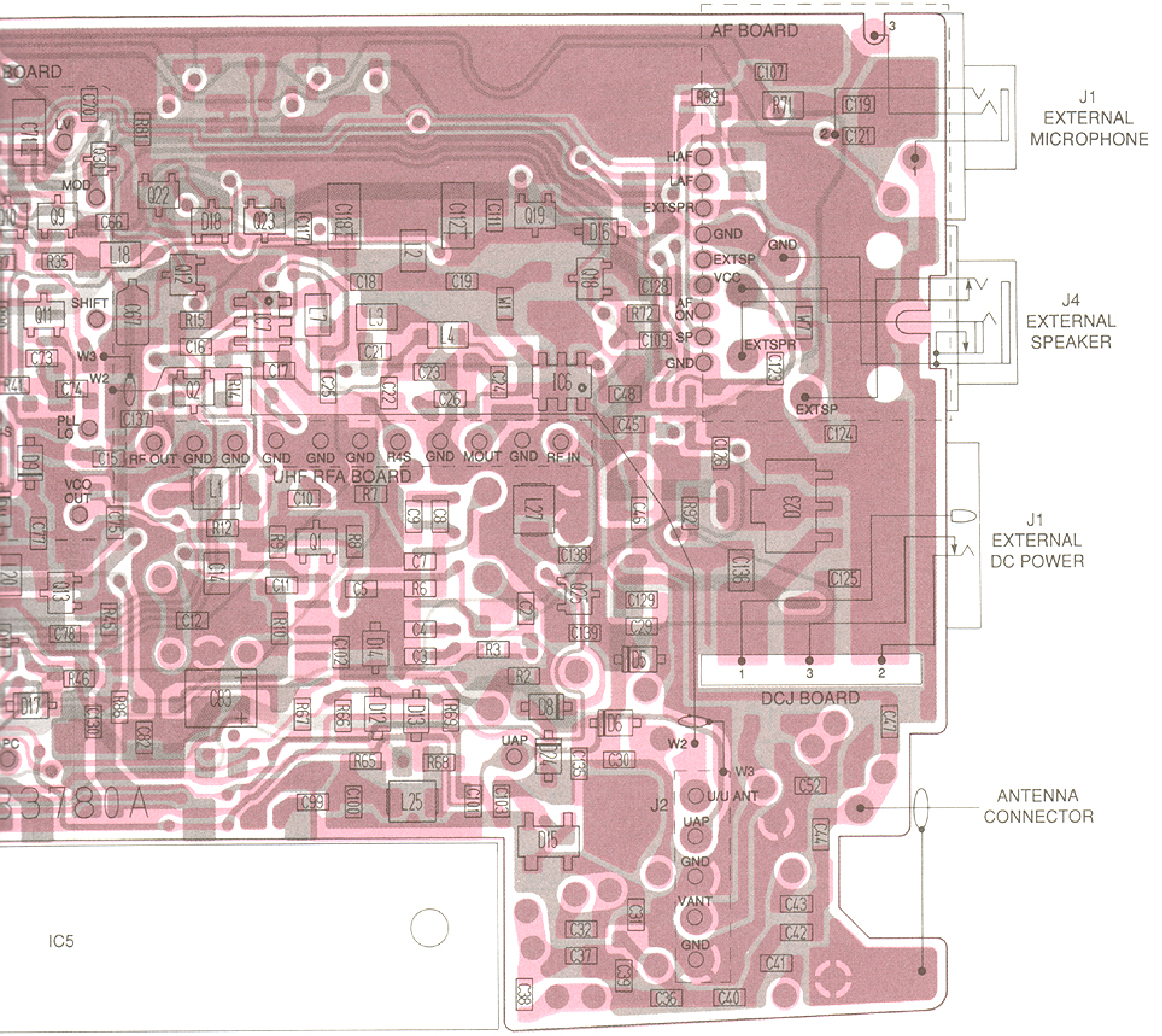


Symbol: 1A

HSU88
D12, D13

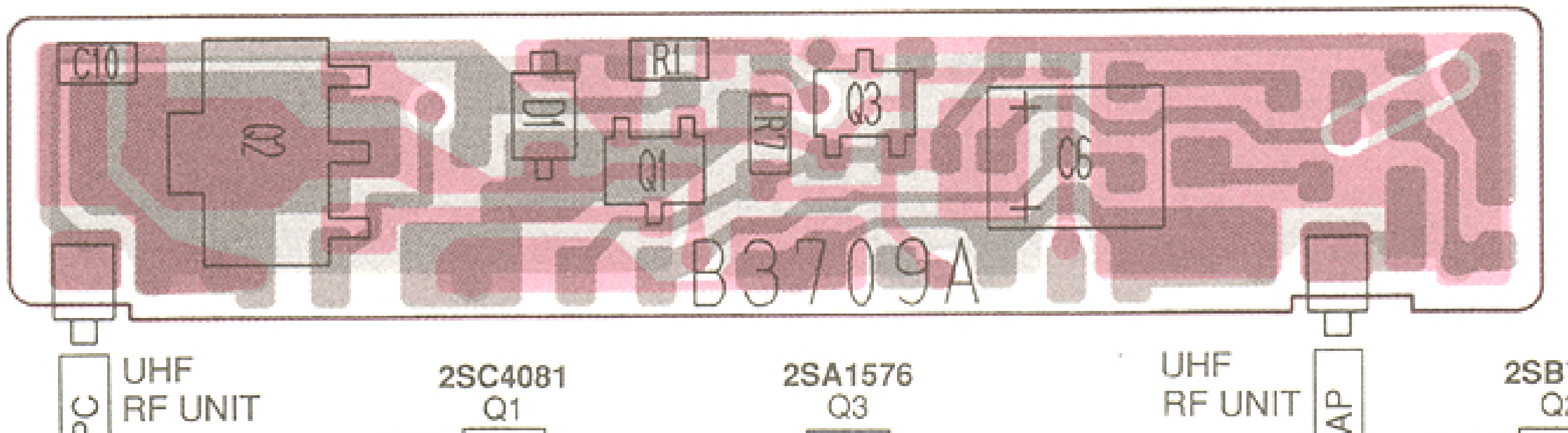


Symbol: 9

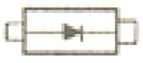

AF BOARD
BOARD
J1
EXTERNAL
MICROPHONE
J4
EXTERNAL
SPEAKER
J1
EXTERNAL
DC POWER
ANTENNA
CONNECTOR
UHF RFA BOARD
DCJ BOARD
J2
IC5
B3780A
HAF
LAF
EXTSPR
GND
EXTSP
VCC
AF ON
SP
GND
EXTSPR
EXTSP
RF OUT
GND
GND
GND
GND
GND
R45
GND
MOUT
GND
RF IN
LV
MOD
SHIFT
W3
W2
PLL LO
VCO OUT
UAP
W2
W3
U/U ANT
UAP
GND
VANT
GND
1
2
3
1
3
2
C107
R89
R71
C119
C121
C70
C71
R81
Q30
Q22
Q9
D18
Q23
C117
C118
C112
C111
Q19
D16
C66
L18
R35
Q12
L2
C18
C19
Q18
W1
C128
Q11
C67
R15
IC7
L7
L3
R72
C109
W7
C123
C73
C16
C21
L4
C74
Q2
R14
C17
C25
C22
C23
C24
C26
IC6
C48
R41
C137
C45
C124
C15
C126
L1
C10
R7
L27
C46
R92
D20
C77
C75
R12
R9
Q1
R8
C9
C8
C138
C136
C14
C7
Q25
C125
Q13
C11
C5
R6
C129
C12
R10
R45
C27
C29
C78
C102
D14
C4
C139
C3
R3
D5
R46
C83
R2
D17
C130
R86
C82
R67
R66
D12
D13
R69
D8
D6
D24
C47
R65
R68
C135
C130
C52
C99
C100
L25
C101
C103
D15
C44
C31
C43
C32
C42
C37
C41
C39
C38
C36
C40

Underside

• UHF APC BOARD (BOTTOM VIEW)

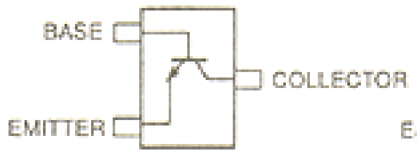

C10
R1
D1
Q2
Q1
R7
Q3
C6
B3709A
APC
UHF
RF UNIT
UHF
RF UNIT
UAP

MA110
D1



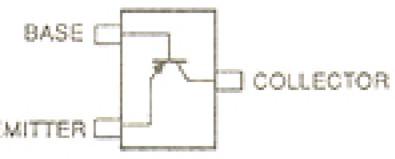
Symbol: 1A

2SC4081
Q1


BASE
COLLECTOR
EMITTER

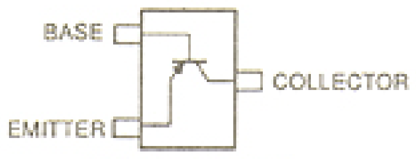
Symbol: BR/BS

2SA1576
Q3


BASE
COLLECTOR
EMITTER

Symbol: FR/FS

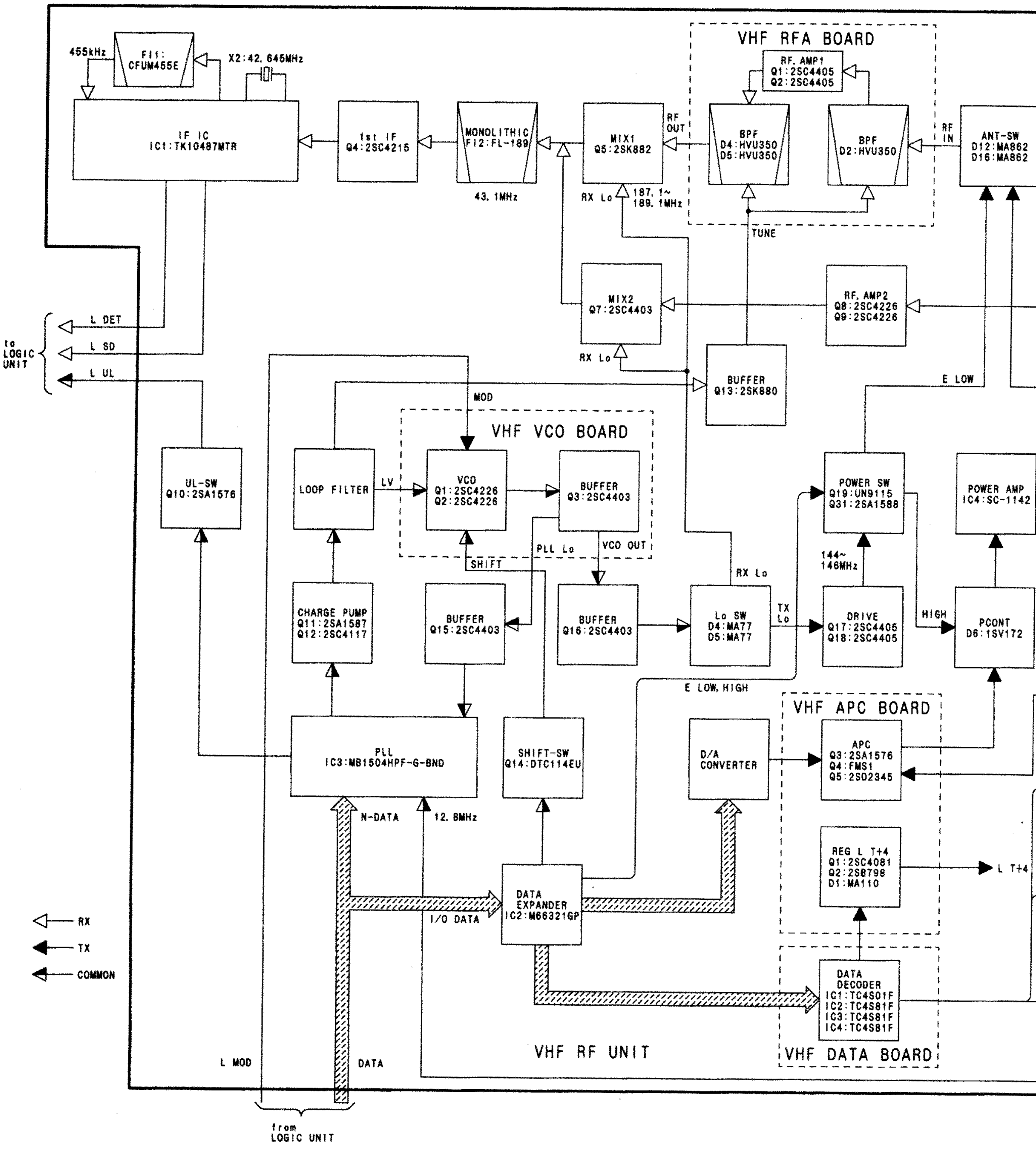
2SB798
Q2


BASE
COLLECTOR
EMITTER

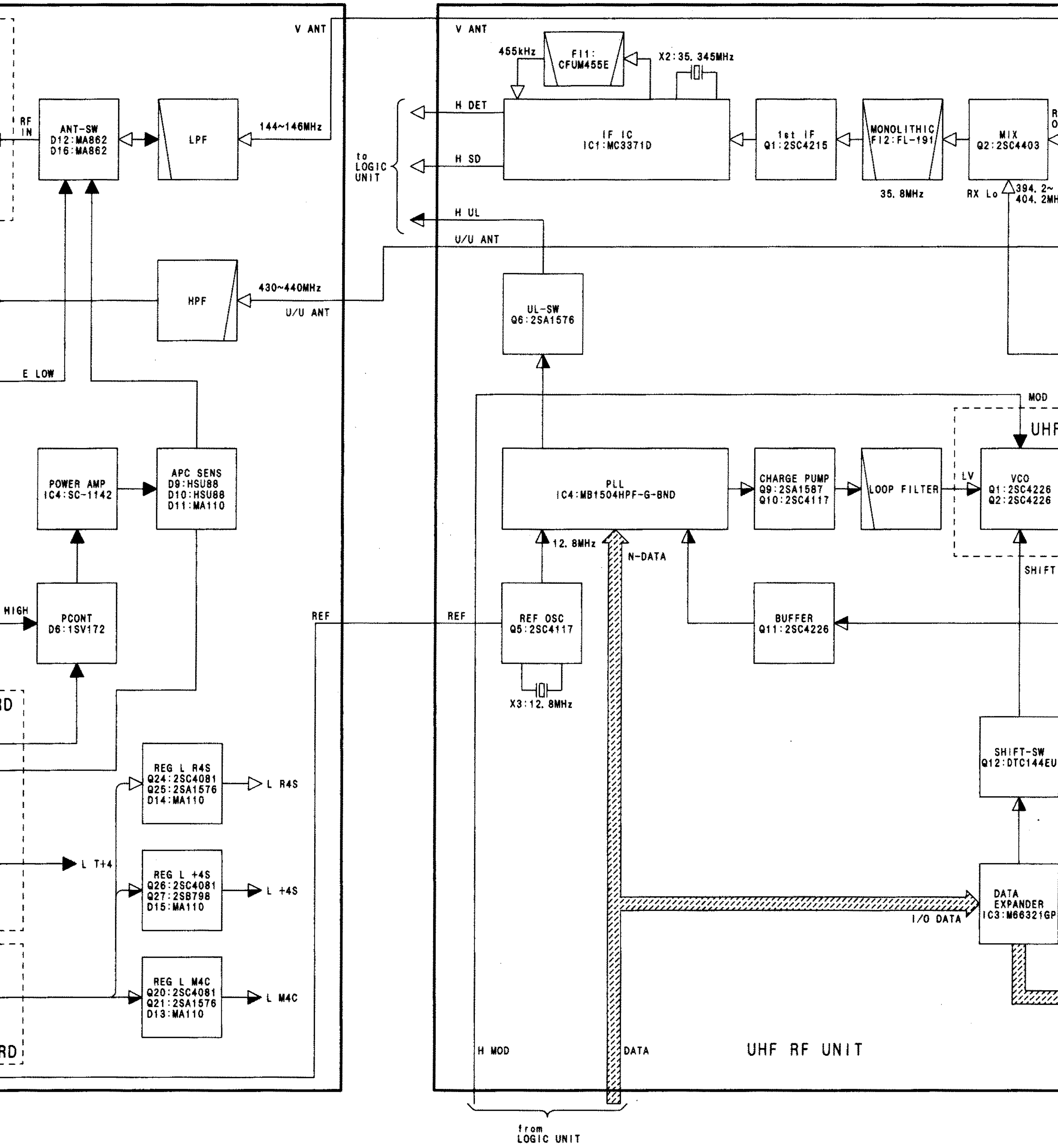
Symbol: DK/DL

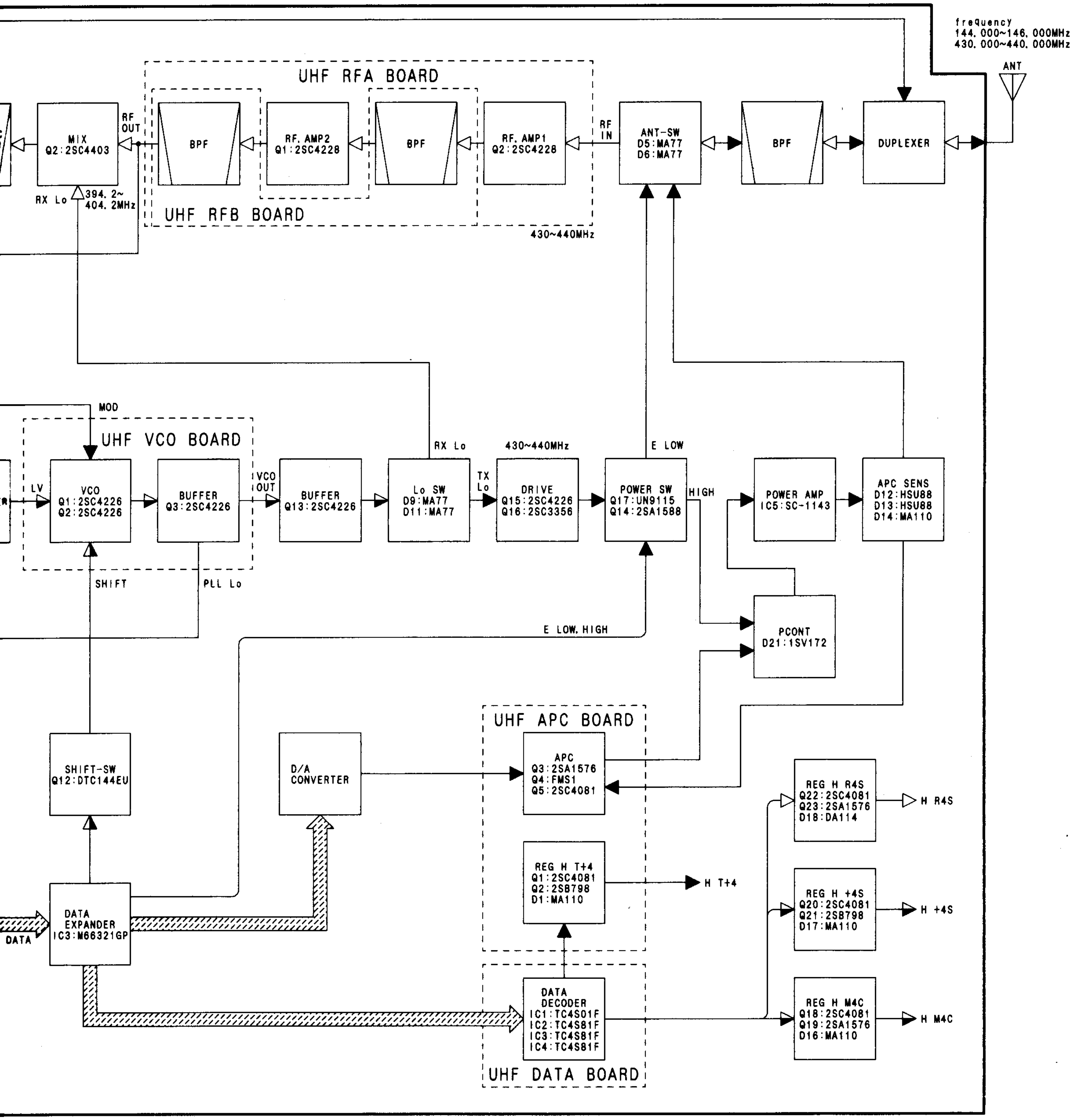
SECTION 9 BLOCK DIAGRAM

9-1 VHR RF AND UHF RF UNITS

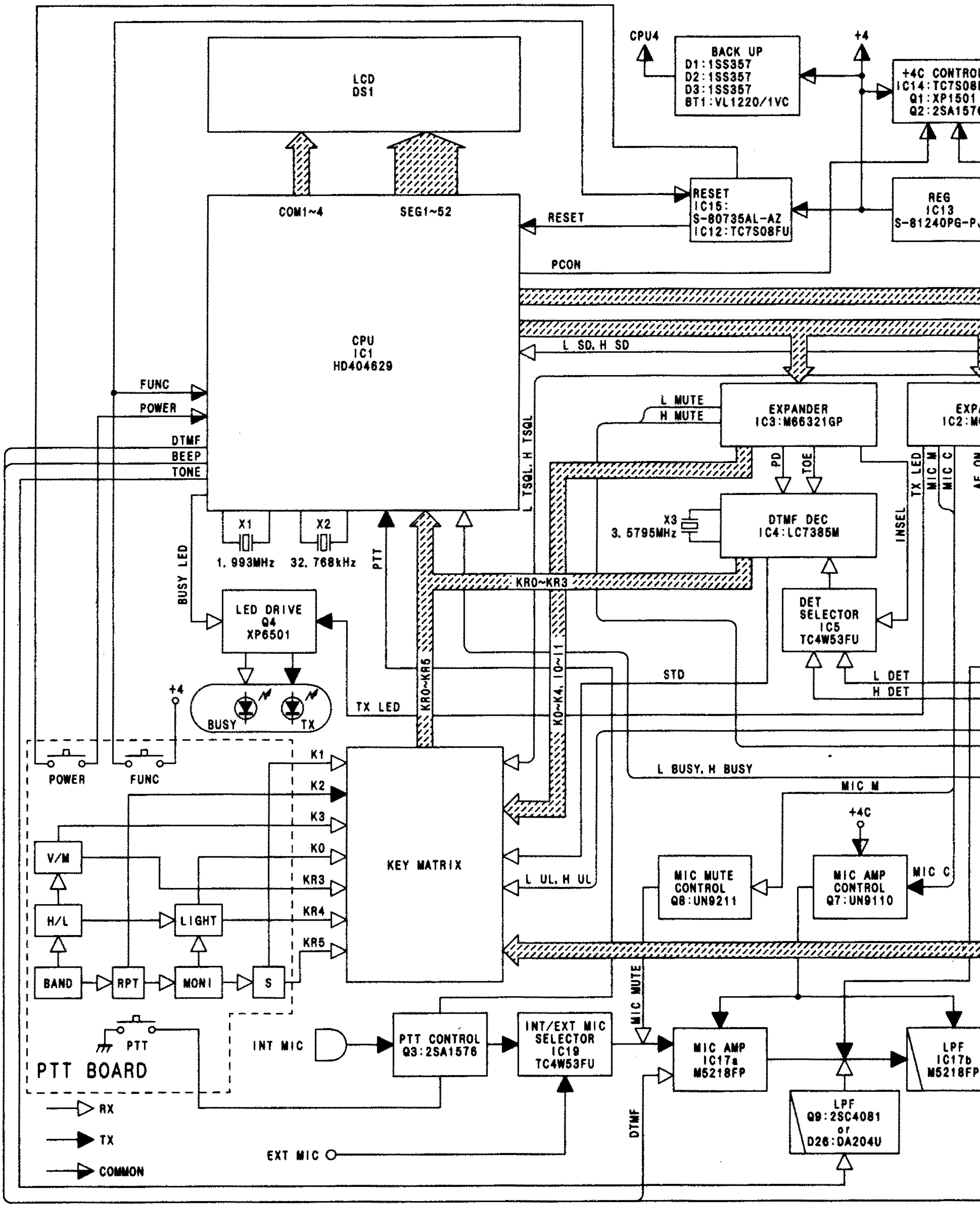


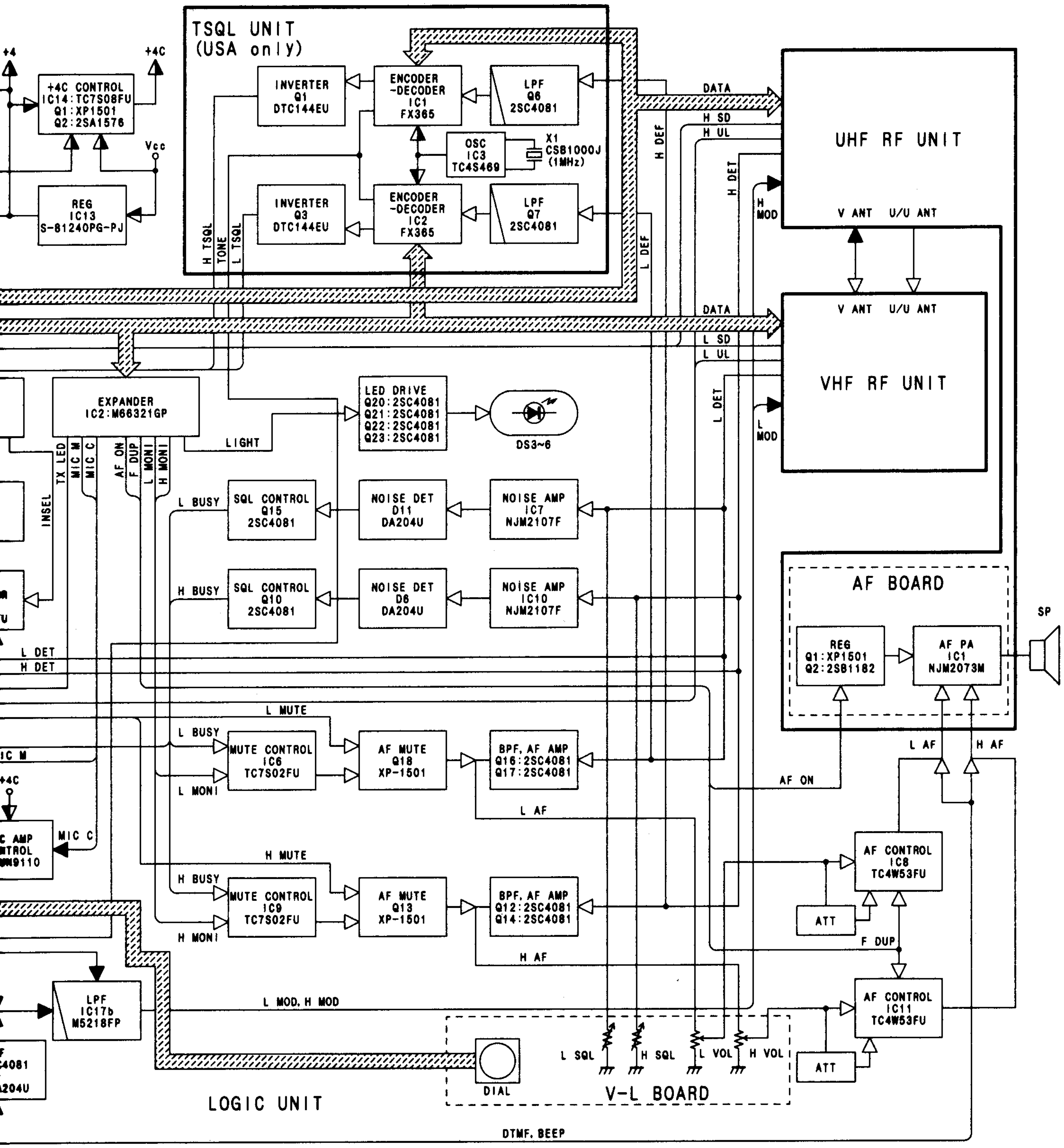
VHF RFA BOARD
RF. AMP1 Q1:2SC4405 Q2:2SC4405
455kHz
FI1: CFUM455E
X2:42.645MHz
IF IC IC1:TK10487MTR
1st IF Q4:2SC4215
MONOLITHIC FI2:FL-189
43.1MHz
MIX1 Q5:2SK882
RF OUT
BPF D4:HVU350 D5:HVU350
BPF D2:HVU350
RF IN
ANT-SW D12:MA862 D16:MA862
RX Lo
187.1~ 189.1MHz
TUNE
MIX2 Q7:2SC4403
RF. AMP2 Q8:2SC4226 Q9:2SC4226
L DET
L SD
L UL
to LOGIC UNIT
RX Lo
BUFFER Q13:2SK880
E LOW
MOD
VHF VCO BOARD
UL-SW Q10:2SA1576
LOOP FILTER
LV
VCO Q1:2SC4226 Q2:2SC4226
BUFFER Q3:2SC4403
POWER SW Q19:UN9115 Q31:2SA1588
POWER AMP IC4:SC-1142
PLL Lo
VCO OUT
SHIFT
RX Lo
144~ 146MHz
CHARGE PUMP Q11:2SA1587 Q12:2SC4117
BUFFER Q15:2SC4403
BUFFER Q16:2SC4403
Lo SW D4:MA77 D5:MA77
TX Lo
DRIVE Q17:2SC4405 Q18:2SC4405
HIGH
PCONT D6:1SV172
E LOW, HIGH
VHF APC BOARD
PLL IC3:MB1504HPF-G-BND
SHIFT-SW Q14:DTC114EU
D/A CONVERTER
APC Q3:2SA1576 Q4:FMS1 Q5:2SD2345
N-DATA
12.8MHz
REG L T+4 Q1:2SC4081 Q2:2SB798 D1:MA110
L T+4
DATA EXPANDER IC2:M66321GP
I/O DATA
RX
TX
COMMON
DATA DECODER IC1:TC4S01F IC2:TC4S81F IC3:TC4S81F IC4:TC4S81F
VHF RF UNIT
VHF DATA BOARD
L MOD
DATA
from LOGIC UNIT


V ANT
RF IN
ANT-SW D12:MA862 D16:MA862
LPF
144~146MHz
HPF
430~440MHz
U/U ANT
E LOW
POWER AMP IC4:SC-1142
APC SENS D9:HSU88 D10:HSU88 D11:MA110
HIGH
PCONT D6:1SV172
REF
3D
L T+4
RD
REG L R4S Q24:2SC4081 Q25:2SA1576 D14:MA110
L R4S
REG L +4S Q26:2SC4081 Q27:2SB798 D15:MA110
L +4S
REG L M4C Q20:2SC4081 Q21:2SA1576 D13:MA110
L M4C
V ANT
455kHz
FI1: CFUM455E
X2:35.345MHz
H DET
H SD
H UL
to LOGIC UNIT
IF IC IC1:MC3371D
1st IF Q1:2SC4215
MONOLITHIC FI2:FL-191
35.8MHz
MIX Q2:2SC4403
RX Lo
394.2~ 404.2MH
U/U ANT
UL-SW Q6:2SA1576
MOD
UHF
PLL IC4:MB1504HPF-G-BND
CHARGE PUMP Q9:2SA1587 Q10:2SC4117
LOOP FILTER
LV
VCO Q1:2SC4226 Q2:2SC4226
12.8MHz
N-DATA
SHIFT
REF
REF OSC Q5:2SC4117
X3:12.8MHz
BUFFER Q11:2SC4226
SHIFT-SW Q12:DTC144EU
DATA EXPANDER IC3:M66321GP
I/O DATA
H MOD
DATA
UHF RF UNIT
from LOGIC UNIT

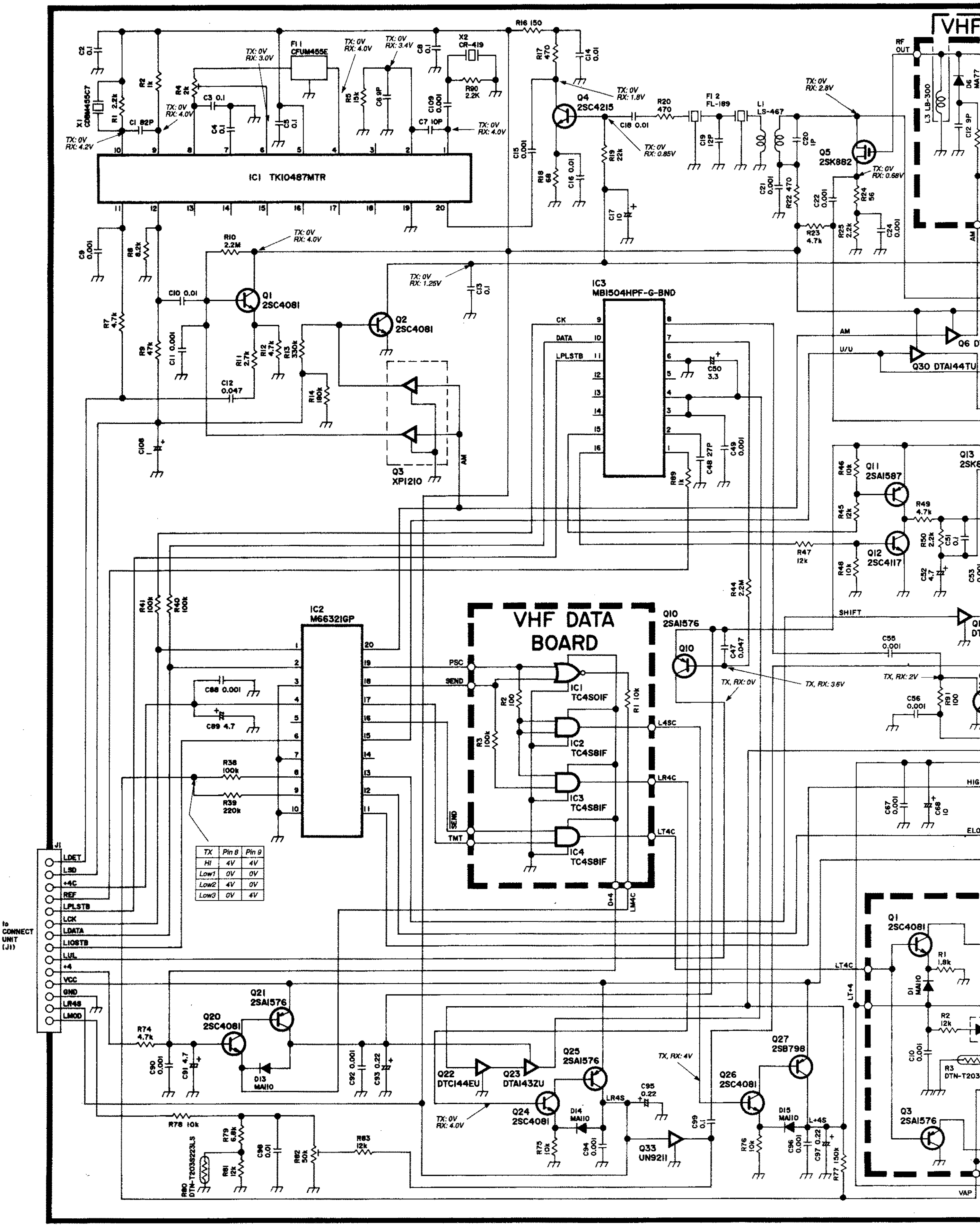

frequency
144. 000~146. 000MHz
430. 000~440. 000MHz
ANT
UHF RFA BOARD
UHF RFB BOARD
MIX
Q2:2SC4403
RF OUT
BPF
RF. AMP2
Q1:2SC4228
BPF
RF. AMP1
Q2:2SC4228
RF IN
ANT-SW
D5:MA77
D6:MA77
BPF
DUPLEXER
RX Lo
394. 2~
404. 2MHz
430~440MHz
MOD
UHF VCO BOARD
LV
VCO
Q1:2SC4226
Q2:2SC4226
BUFFER
Q3:2SC4226
VCO OUT
BUFFER
Q13:2SC4226
RX Lo
Lo SW
D9:MA77
D11:MA77
TX Lo
430~440MHz
DRIVE
Q15:2SC4226
Q16:2SC3356
E LOW
POWER SW
Q17:UN9115
Q14:2SA1588
HIGH
POWER AMP
IC5:SC-1143
APC SENS
D12:HSU88
D13:HSU88
D14:MA110
SHIFT
PLL Lo
E LOW, HIGH
PCONT
D21:1SV172
UHF APC BOARD
SHIFT-SW
Q12:DTC144EU
D/A
CONVERTER
APC
Q3:2SA1576
Q4:FMS1
Q5:2SC4081
REG H R4S
Q22:2SC4081
Q23:2SA1576
D18:DA114
H R4S
REG H T+4
Q1:2SC4081
Q2:2SB798
D1:MA110
H T+4
REG H +4S
Q20:2SC4081
Q21:2SB798
D17:MA110
H +4S
DATA
DATA
EXPANDER
IC3:M66321GP
DATA
DECODER
IC1:TC4S01F
IC2:TC4S81F
IC3:TC4S81F
IC4:TC4S81F
REG H M4C
Q18:2SC4081
Q19:2SA1576
D16:MA110
H M4C
UHF DATA BOARD

9-2 LOGIC UNIT


LCD
DS1
COM1~4
SEG1~52
CPU
IC1
HD404629
CPU4
BACK UP
D1:1SS357
D2:1SS357
D3:1SS357
BT1:VL1220/1VC
+4
+4C CONTRO
IC14:TC7S08
Q1:XP1501
Q2:2SA157
RESET
IC15:
S-80735AL-AZ
IC12:TC7S08FU
REG
IC13
S-81240PG-P
RESET
PCON
L SD, H SD
FUNC
POWER
DTMF
BEEP
TONE
L MUTE
H MUTE
EXPANDER
IC3:M66321GP
EXP
IC2:M
L TSQL, H TSQL
PD
TOE
TX LED
MIC M
MIC C
AF ON
X3
3.5795MHz
DTMF DEC
IC4:LC7385M
INSEL
X1
1.993MHz
X2
32.768kHz
PTT
BUSY LED
KR0~KR3
LED DRIVE
Q4
XP6501
DET
SELECTOR
IC5
TC4W53FU
STD
L DET
H DET
BUSY
TX
+4
TX LED
KR0~KR5
K0~K4, I0~I1
POWER
FUNC
K1
K2
K3
K0
KR3
KR4
KR5
L BUSY, H BUSY
MIC M
+4C
KEY MATRIX
V/M
H/L
LIGHT
BAND
RPT
MONI
S
L UL, H UL
MIC MUTE
CONTROL
Q8:UN9211
MIC AMP
CONTROL
Q7:UN9110
MIC C
PTT
PTT BOARD
INT MIC
PTT CONTROL
Q3:2SA1576
INT/EXT MIC
SELECTOR
IC19
TC4W53FU
MIC MUTE
MIC AMP
IC17a
M5218FP
LPF
IC17b
M5218FP
LPF
Q9:2SC4081
or
D26:DA204U
DTMF
EXT MIC
RX
TX
COMMON

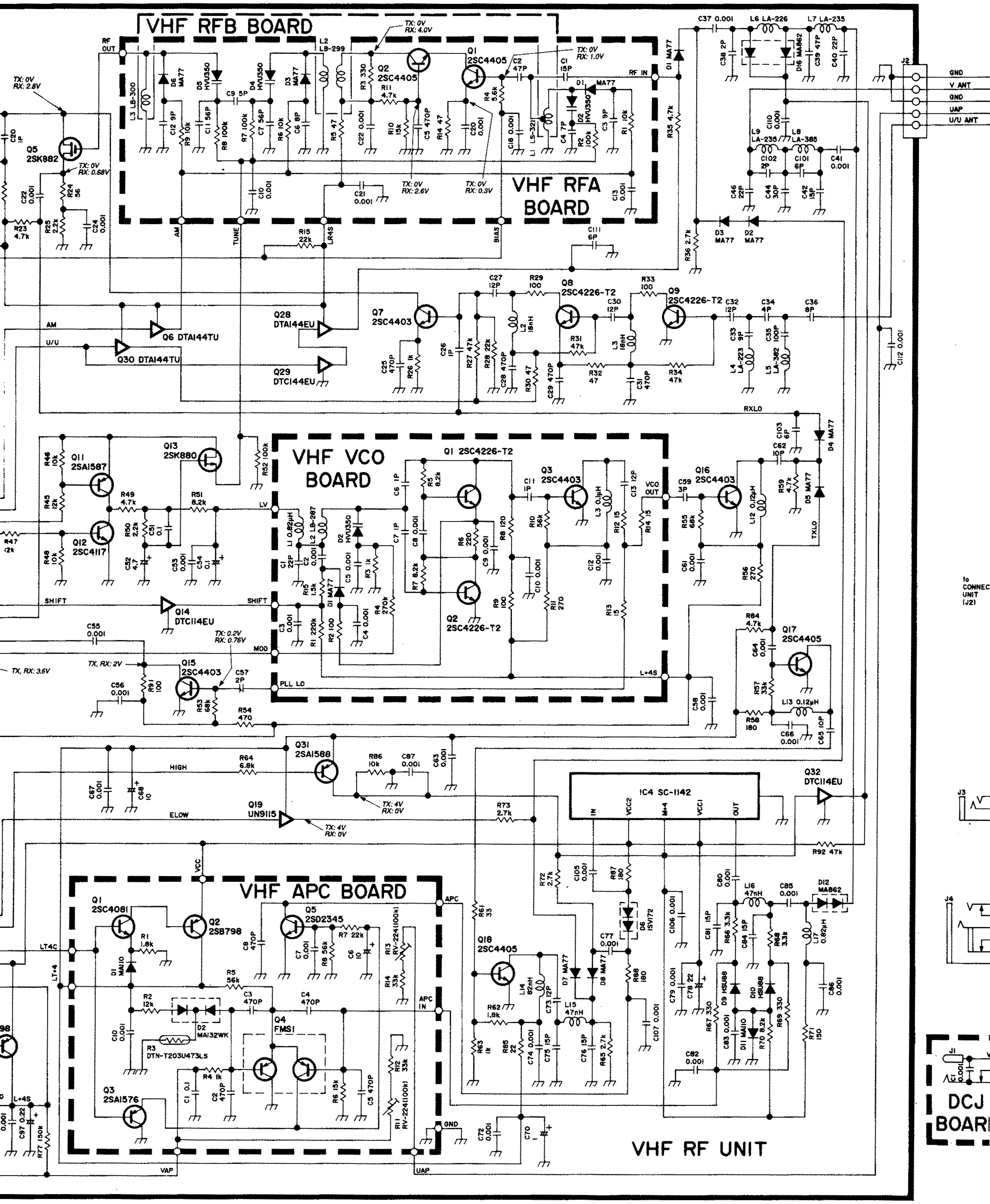

TSQL UNIT
(USA only)
INVERTER Q1 DTC144EU
ENCODER -DECODER IC1 FX365
LPF Q6 2SC4081
OSC IC3 TC4S469
X1 CSB1000J (1MHz)
INVERTER Q3 DTC144EU
ENCODER -DECODER IC2 FX365
LPF Q7 2SC4081
H TSQL
TONE
L TSQL
+4
+4C
+4C CONTROL IC14:TC7S08FU Q1:XP1501 Q2:2SA1576
Vcc
REG IC13 S-81240PG-PJ
DATA
H SD
H UL
H DEF
H DET
H MOD
UHF RF UNIT
V ANT
U/U ANT
L DEF
DATA
L SD
L UL
L DET
L MOD
VHF RF UNIT
EXPANDER IC2:M66321GP
LED DRIVE Q20:2SC4081 Q21:2SC4081 Q22:2SC4081 Q23:2SC4081
DS3~6
LIGHT
TX LED
MIC M
MIC C
AF ON
F DUP
L MONI
H MONI
INSEL
L BUSY
SQL CONTROL Q15 2SC4081
NOISE DET D11 DA204U
NOISE AMP IC7 NJM2107F
H BUSY
SQL CONTROL Q10 2SC4081
NOISE DET D6 DA204U
NOISE AMP IC10 NJM2107F
AF BOARD
REG Q1:XP1501 Q2:2SB1182
AF PA IC1 NJM2073M
SP
L DET
H DET
L MUTE
L BUSY
MUTE CONTROL IC6 TC7S02FU
L MONI
AF MUTE Q18 XP-1501
BPF, AF AMP Q16:2SC4081 Q17:2SC4081
L AF
H AF
AF ON
L AF
IC M
+4C
C AMP
NTROL
UN9110
MIC C
H MUTE
H BUSY
MUTE CONTROL IC9 TC7S02FU
H MONI
AF MUTE Q13 XP-1501
BPF, AF AMP Q12:2SC4081 Q14:2SC4081
H AF
AF CONTROL IC8 TC4W53FU
ATT
F DUP
AF CONTROL IC11 TC4W53FU
ATT
LPF IC17b M5218FP
L MOD, H MOD
C4081
A204U
DIAL
L SQL
H SQL
L VOL
H VOL
V-L BOARD
LOGIC UNIT
DTMF, BEEP

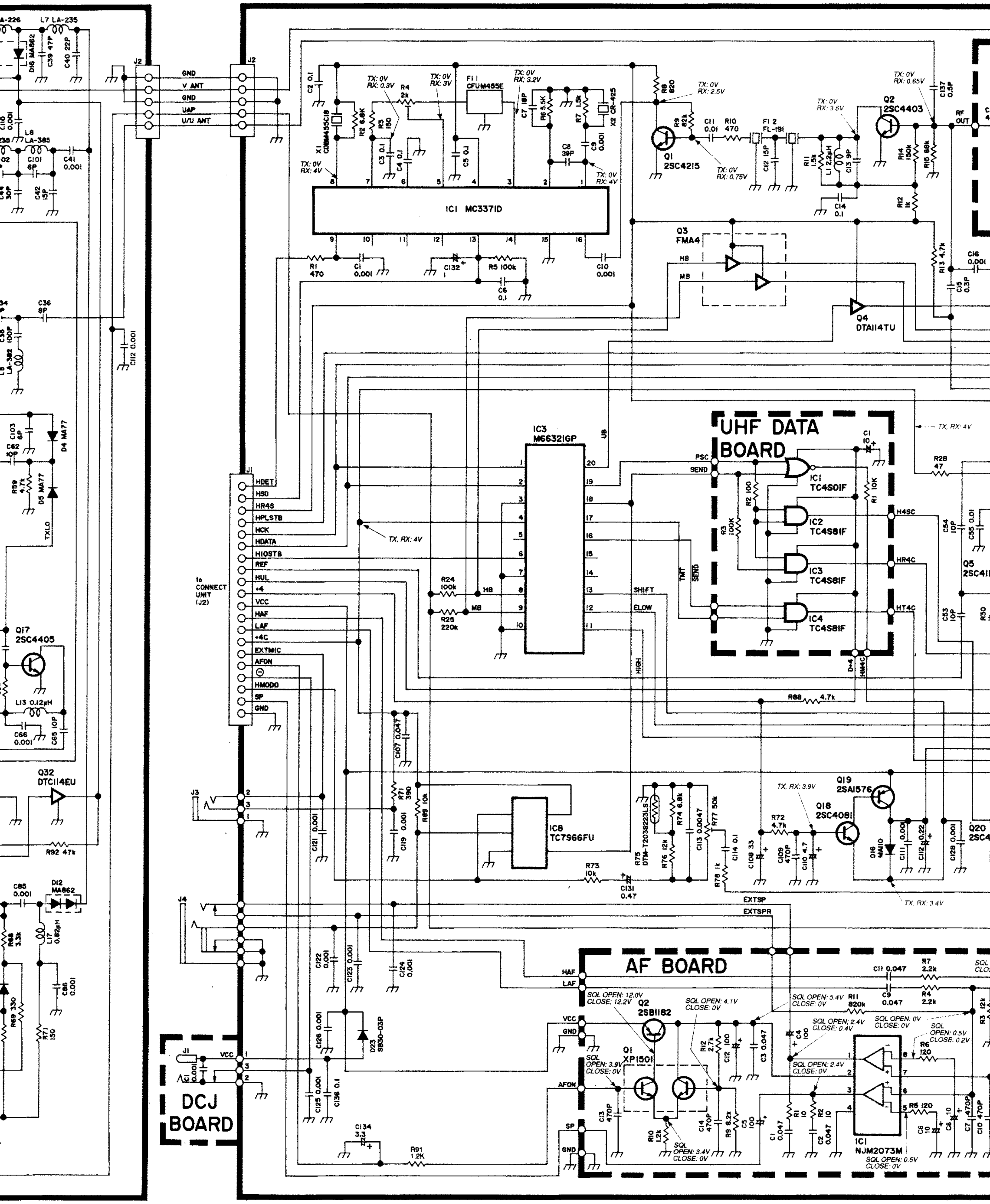
SECTION 10 VOLTAGE DIAGRAMS



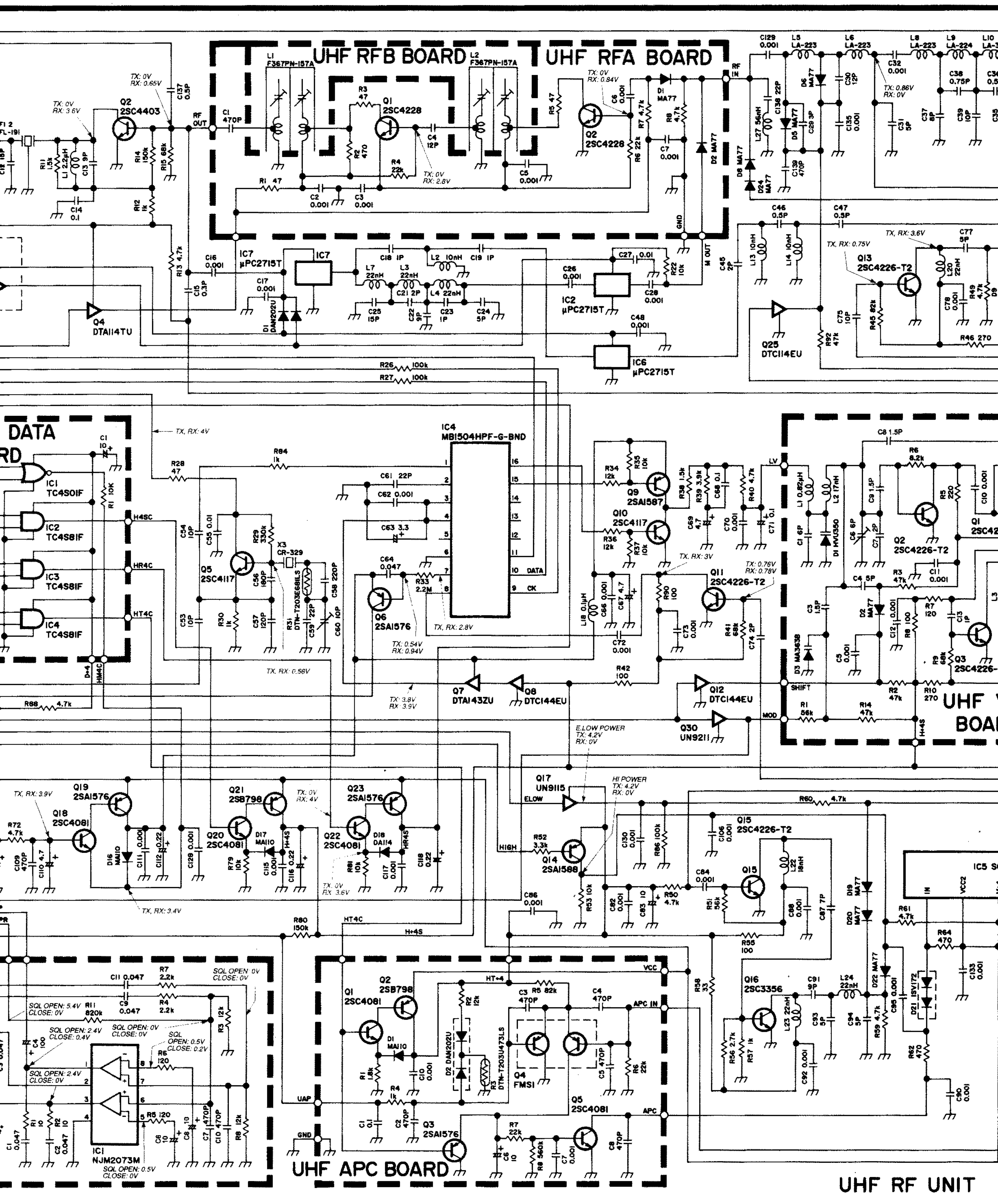
IC1 TK10487MTR
X1 CDB455C7
FI1 CFUM455E
X2 CR-419
TX: 0V RX: 4.2V
TX: 0V RX: 4.0V
TX: 0V RX: 3.0V
TX: 0V RX: 3.4V
TX: 0V RX: 1.8V
TX: 0V RX: 0.85V
TX: 0V RX: 2.8V
TX: 0V RX: 0.68V
TX: 0V RX: 1.25V
Q1 2SC4081
Q2 2SC4081
Q3 XP1210
Q4 2SC4215
Q5 2SK882
FI2 FL-189
L1 LS-467
L3 LB-300
RF OUT
IC3 MB1504HPF-G-BND
CK
DATA
LPLSTB
AM
U/U
Q30 DTA144TU
Q11 2SA1587
Q12 2SC4117
SHIFT
IC2 M66321GP
VHF DATA BOARD
PSC
SEND
TMT
IC1 TC4S01F
IC2 TC4S81F
IC3 TC4S81F
IC4 TC4S81F
L4SC
LR4C
LT4C
D+4
LM4C
Q10 2SA1576
TX, RX: 0V
TX, RX: 3.6V
TX, RX: 2V
J1
to CONNECT UNIT (J1)
LDET
LSD
+4C
REF
LPLSTB
LCK
LDATA
LIOSTB
LUL
+4
VCC
GND
LR4S
LMOD
Q20 2SC4081
Q21 2SA1576
D13 MA110
Q22 DTC144EU
Q23 DTA143ZU
Q24 2SC4081
Q25 2SA1576
D14 MA110
LR4S
TX: 0V RX: 4.0V
Q33 UN9211
TX, RX: 4V
Q26 2SC4081
Q27 2SB798
D15 MA110
L+4S
R80 DTN-T2035223LS
Q1 2SC4081
D1 MA110
Q3 2SA1576
LT4C
LT+4
VAP

TX	Pin 8	Pin 9
HI	4V	4V
Low1	0V	0V
Low2	4V	0V
Low3	0V	4V

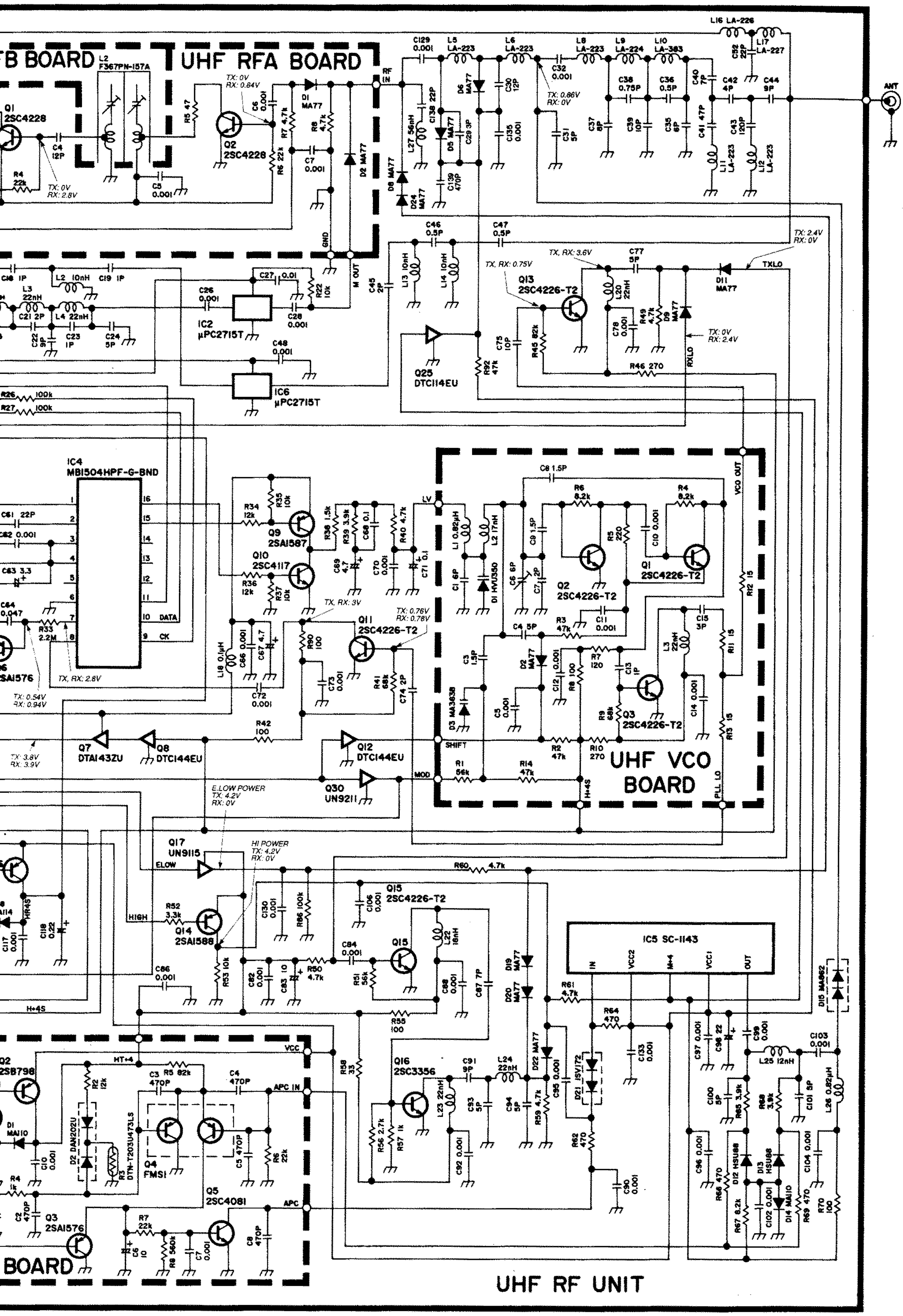

VHF RFB BOARD
VHF RFA BOARD
VHF VCO BOARD
VHF APC BOARD
VHF RF UNIT
DCJ BOARD
RF OUT
RF IN
AM
TUNE
LR4S
BIAS
TX: 0V RX: 4.0V
TX: 0V RX: 1.0V
TX: 0V RX: 2.8V
TX: 0V RX: 0.68V
TX: 0V RX: 2.6V
TX: 0V RX: 0.3V
L3 LB-300
D6 MA77
D5 HVU350
D4 HVU350
D3 MA77
L2 LB-299
Q2 2SC4405
Q1 2SC4405
D1 MA77
D2 HVU350
L1 LS-321
C9 5P
C2 47P
C1 15P
Q5 2SK882
R23 4.7k
R25 2.2k
R24 56
R15 22k
C37 0.001
L6 LA-226
L7 LA-235
D16 MA862
L9 LA-235
L8 LA-385
D3 MA77
D2 MA77
D1 MA77
R35 4.7k
R36 2.7k
J2
GND
V ANT
GND
UAP
U/U ANT
Q6 DTA144TU
Q28 DTA144EU
Q29 DTC144EU
Q30 DTA144TU
Q7 2SC4403
Q8 2SC4226-T2
Q9 2SC4226-T2
C111 6P
C112 0.001
L4 LA-223
L5 LA-382
RXLO
TXLO
Q11 2SA1587
Q12 2SC4117
Q13 2SK880
Q1 2SC4226-T2
Q2 2SC4226-T2
Q3 2SC4403
L1 0.82μH
L2 LB-287
D2 HVU350
D1 MA77
LV
SHIFT
MOD
PLL LO
VCO OUT
L+4S
L3 0.1μH
Q14 DTC114EU
Q15 2SC4403
TX: 0.2V RX: 0.76V
TX, RX: 2V
TX, RX: 3.6V
Q16 2SC4403
L12 0.12μH
D4 MA77
D5 MA77
Q17 2SC4405
L13 0.12μH
to CONNECT UNIT (J2)
Q31 2SA1588
Q19 UN9115
HIGH
ELOW
R64 6.8k
TX: 4V RX: 0V
IC4 SC-1142
IN
VCC2
M+4
VCC1
OUT
Q32 DTC114EU
R92 47k
VCC
APC
APC IN
GND
VAP
UAP
LT4C
LT+4
L+4S
Q1 2SC4081
Q2 2SB798
Q3 2SA1576
Q4 FMS1
Q5 2SD2345
D1 MA110
D2 MA132WK
R3 DTN-T203U473LS
R13 RV-224(100k)
R11 RV-224(100k)
Q18 2SC4405
L14 82nH
L15 47nH
D7 MA77
D8 MA77
D6 1SV172
L16 47nH
D12 MA862
L17 0.82μH
D9 HSU88
D10 HSU88
D11 MA110
J1
J3
J4



L7 LA-235
D16 MA862
C39 47P
C40 22P
L8 LA-385
C101 6P
C41 0.001
C42 15P
J2
GND
V ANT
GND
UAP
U/U ANT
C112 0.001
C36 8P
C35 100P
L5 LA-382
C103 6P
C62 10P
D4 MA77
R59 4.7k
D5 MA77
TXLO
Q17 2SC4405
L13 0.12μH
C66 0.001
C65 10P
Q32 DTC114EU
R92 47k
C85 0.001
D12 MA862
R68 3.3k
L17 0.82μH
C86 0.001
R69 330
R71 150
C2 0.1
X1 CDBM455C18
R2 6.8K
R3 150
TX: 0V RX: 0.3V
R4 2k
TX: 0V RX: 3V
F11 CFUM455E
TX: 0V RX: 3.2V
C7 18P
R6 5.5K
R7 1.5k
X2 CR-425
C8 39P
C9 0.001
C3 0.1
C4 0.1
C5 0.1
TX: 0V RX: 4V
IC1 MC3371D
R1 470
C1 0.001
C132 1
R5 100k
C6 0.1
C10 0.001
R8 820
TX: 0V RX: 2.5V
R9 82k
C11 0.01
R10 470
F12 FL-191
Q1 2SC4215
TX: 0V RX: 0.75V
C12 15P
TX: 0V RX: 3.6V
R11 1.5k
L1 2.2μH
C13 9P
C14 0.1
Q2 2SC4403
TX: 0V RX: 0.65V
C137 0.5P
RF OUT
R14 150k
R15 68k
R12 1k
R13 4.7k
C16 0.001
C15 0.3P
Q3 FMA4
HB
MB
Q4 DTA114TU
IC3 M66321GP
UB
J1
HDET
HSD
HR4S
HPLSTB
HCK
HDATA
HIOSTB
REF
HUL
+4
VCC
HAF
LAF
+4C
EXTMIC
AFON
⊖
HMODO
SP
GND
to CONNECT UNIT (J2)
TX, RX: 4V
R24 100k
R25 220k
SHIFT
ELOW
HIGH
UHF DATA BOARD
PSC
SEND
C1 10
IC1 TC4S01F
R2 100
R1 10K
R3 100K
IC2 TC4S81F
IC3 TC4S81F
IC4 TC4S81F
TMT
H4SC
HR4C
HT4C
D-4
HM4C
TX, RX: 4V
R28 47
C54 10P
C55 0.01
Q5 2SC41
C53 10P
R30
R88 4.7k
J3
C107 0.047
R71 390
R89 10k
C121 0.001
C119 0.001
IC8 TC7S66FU
R75 OTM-T203S223LS
R74 6.8k
C113 0.0047
R77 50k
R76 12k
R73 10k
C131 0.47
R78 1k
C114 0.1
TX, RX: 3.9V
R72 4.7k
Q18 2SC4081
Q19 2SA1576
C108 33
C109 470P
C110 4.7
D16 MA110
C111 0.001
C112 0.22
C128 0.001
Q20 2SC4
TX, RX: 3.4V
EXTSP
EXTSPR
J4
C122 0.001
C123 0.001
C124 0.001
AF BOARD
HAF
LAF
C11 0.047
R7 2.2k
C9 0.047
R4 2.2k
SQL OPEN: 12.0V CLOSE: 12.2V
Q2 2SB1182
SQL OPEN: 4.1V CLOSE: 0V
SQL OPEN: 5.4V CLOSE: 0V
R11 820k
SQL OPEN: 2.4V CLOSE: 0.4V
SQL OPEN: 0V CLOSE: 0V
SQL OPEN: 0.5V CLOSE: 0.2V
R6 120
R3 12k
VCC
GND
C126 0.001
D23 SB30-03P
J1
VCC
C1 0.001
DCJ BOARD
C125 0.001
C136 0.1
SQL OPEN: 3.9V CLOSE: 0V
Q1 XP1501
R12 2.7k
C12 100
C3 0.047
C4 100
SQL OPEN: 2.4V CLOSE: 0V
AFON
C13 470P
R10 12k
SQL OPEN: 3.4V CLOSE: 0V
C14 470P
R9 8.2k
C5 100
C1 0.047
R1 10
R2 10
C2 0.047
IC1 NJM2073M
SQL OPEN: 0.5V CLOSE: 0V
R5 120
C6 10
C8 10
C7 470P
C10 470P
SP
GND
C134 3.3
R91 1.2K


UHF RFB BOARD
UHF RFA BOARD
L1 F367PN-157A
L2 F367PN-157A
Q1 2SC4228
Q2 2SC4228
Q2 2SC4403
RF OUT
RF IN
C1 470P
D1 MA77
D2 MA77
IC7 µPC2715T
IC2 µPC2715T
IC6 µPC2715T
D1 DAN202U
Q4 DTA114TU
Q13 2SC4226-T2
Q25 DTC114EU
L5 LA-223
L6 LA-223
L8 LA-223
L9 LA-224
FI 2 FL-191
TX: 0V RX: 0.65V
TX: 0V RX: 3.6V
TX: 0V RX: 0.84V
TX: 0V RX: 2.8V
TX: 0.86V RX: 0V
TX, RX: 0.75V
TX, RX: 3.6V
DATA
IC1 TC4S01F
IC2 TC4S81F
IC3 TC4S81F
IC4 TC4S81F
H4SC
HR4C
HT4C
D+4
HM4C
TX, RX: 4V
IC4 MB1504HPF-G-BND
DATA
CK
Q5 2SC4117
X3 CR-329
Q6 2SA1576
TX, RX: 2.8V
TX: 0.54V RX: 0.94V
TX, RX: 0.58V
TX: 3.8V RX: 3.9V
Q7 DTA143ZU
Q8 DTC144EU
Q9 2SA1587
Q10 2SC4117
Q11 2SC4226-T2
TX, RX: 3V
TX: 0.76V RX: 0.78V
Q12 DTC144EU
Q30 UN9211
LV
SHIFT
MOD
H+4S
UHF VCO BOARD
Q1 2SC4226-T2
Q2 2SC4226-T2
Q3 2SC4226-T2
D1 HVU350
D2 MA77
D3 MA3638
E.LOW POWER TX: 4.2V RX: 0V
HI POWER TX: 4.2V RX: 0V
Q17 UN9115
ELOW
HIGH
Q14 2SA1588
Q15 2SC4226-T2
Q16 2SC3356
D19 MA77
D20 MA77
D22 MA77
D21 1SV172
IC5
Q19 2SA1576
Q18 2SC4081
D16 MA110
TX, RX: 3.9V
TX, RX: 3.4V
Q21 2SB798
Q20 2SC4081
D17 MA110
Q23 2SA1576
Q22 2SC4081
D18 DA114
TX: 0V RX: 4V
TX: 0V RX: 3.6V
HT4C
H+4S
SQL OPEN: 0V CLOSE: 0V
SQL OPEN: 5.4V CLOSE: 0V
SQL OPEN: 2.4V CLOSE: 0.4V
SQL OPEN: 0V CLOSE: 0V
SQL OPEN: 0.5V CLOSE: 0.2V
SQL OPEN: 2.4V CLOSE: 0V
SQL OPEN: 0.5V CLOSE: 0V
IC1 NJM2073M
UHF APC BOARD
Q1 2SC4081
Q2 2SB798
D1 MA110
D2 DAN202U
R3 DTN-T203U473LS
Q4 FMS1
Q5 2SC4081
Q3 2SA1576
HT+4
VCC
APC IN
APC
UAP
GND

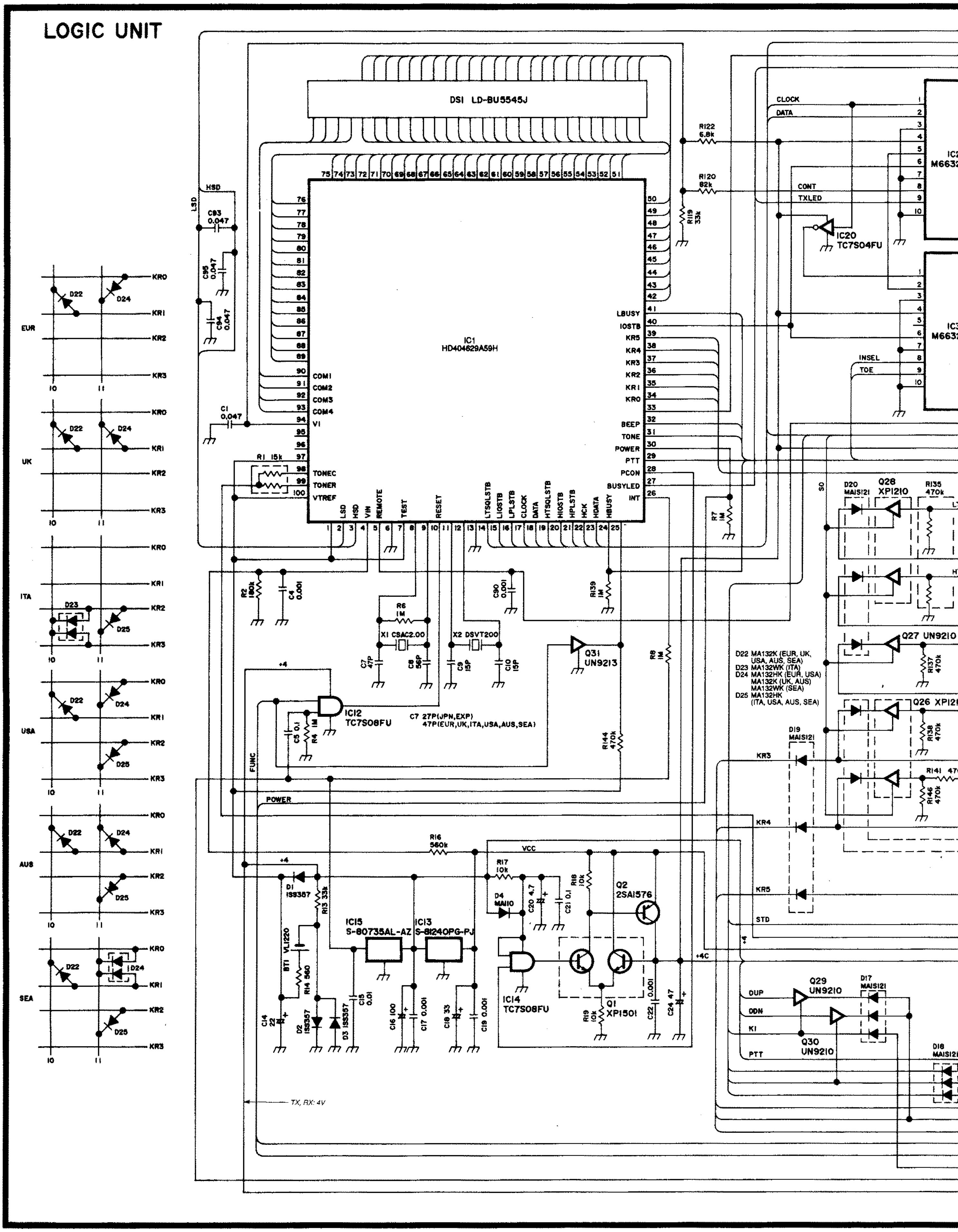
UHF RF UNIT

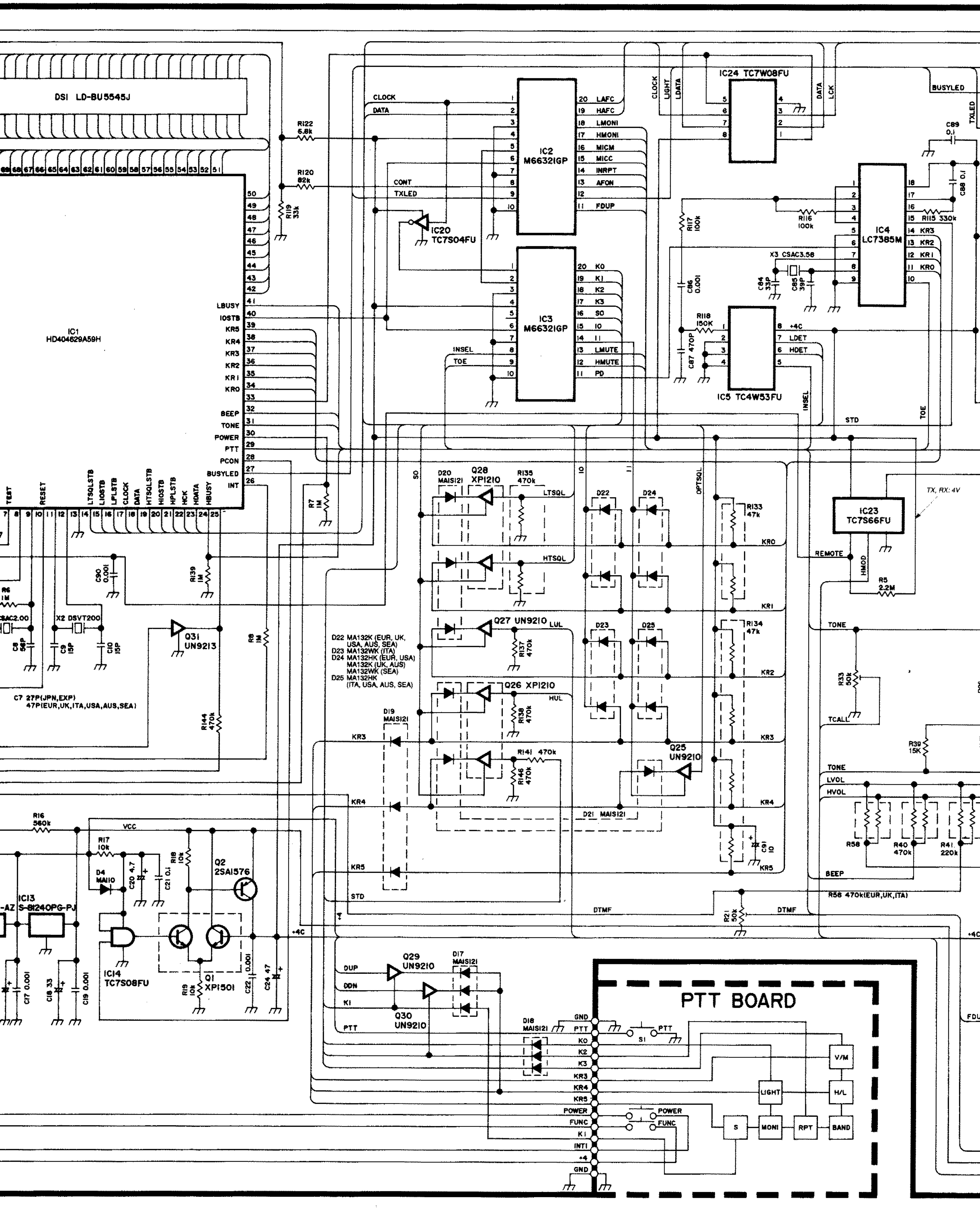


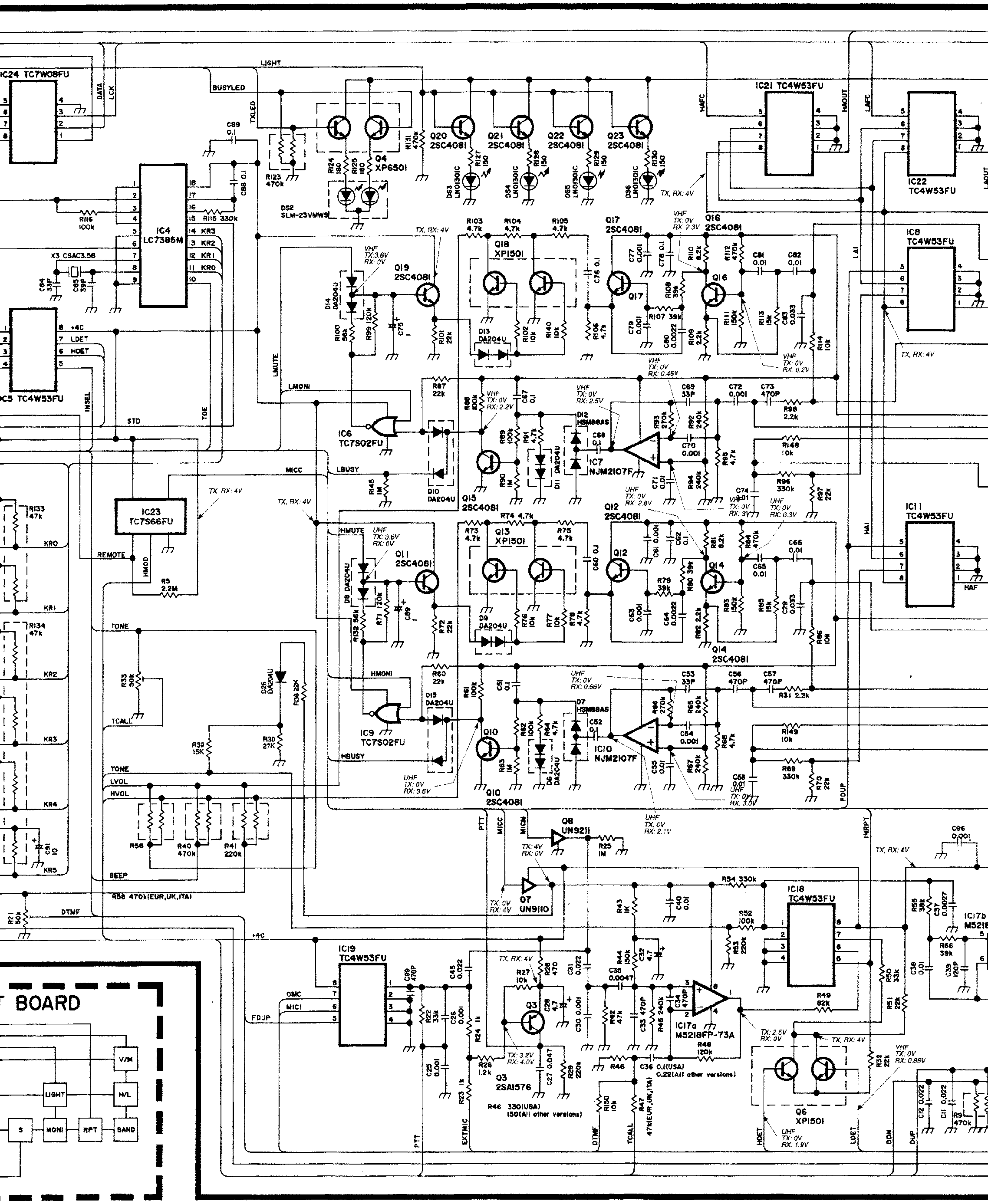
UHF RFA BOARD
UHF VCO BOARD
BOARD
IC4 MB1504HPF-G-BND
IC2 µPC2715T
IC6 µPC2715T
IC5 SC-1143
Q1 2SC4228
Q2 2SC4228
Q9 2SA1587
Q10 2SC4117
Q11 2SC4226-T2
Q13 2SC4226-T2
Q15 2SC4226-T2
Q16 2SC3356
Q14 2SA1588
Q17 UN9115
Q7 DTA143ZU
Q8 DTC144EU
Q12 DTC144EU
Q25 DTC114EU
Q30 UN9211
Q1 2SC4226-T2
Q2 2SC4226-T2
Q3 2SC4226-T2
Q2 2SB798
Q3 2SA1576
Q4 FMS1
Q5 2SC4081
ANT
RF IN
GND
M OUT
TXLO
RXLO
VCO OUT
PLL LO
LV
SHIFT
MOD
H+4S
DATA
CK
ELOW
HIGH
VCC
APC IN
APC
HT+4
E.LOW POWER TX: 4.2V RX: 0V
HI POWER TX: 4.2V RX: 0V
TX: 0V RX: 0.84V
TX: 0V RX: 2.8V
TX: 0.86V RX: 0V
TX: 2.4V RX: 0V
TX, RX: 3.6V
TX, RX: 0.75V
TX: 0V RX: 2.4V
TX, RX: 3V
TX: 0.76V RX: 0.78V
TX, RX: 2.8V
TX: 0.54V RX: 0.94V
TX: 3.8V RX: 3.9V

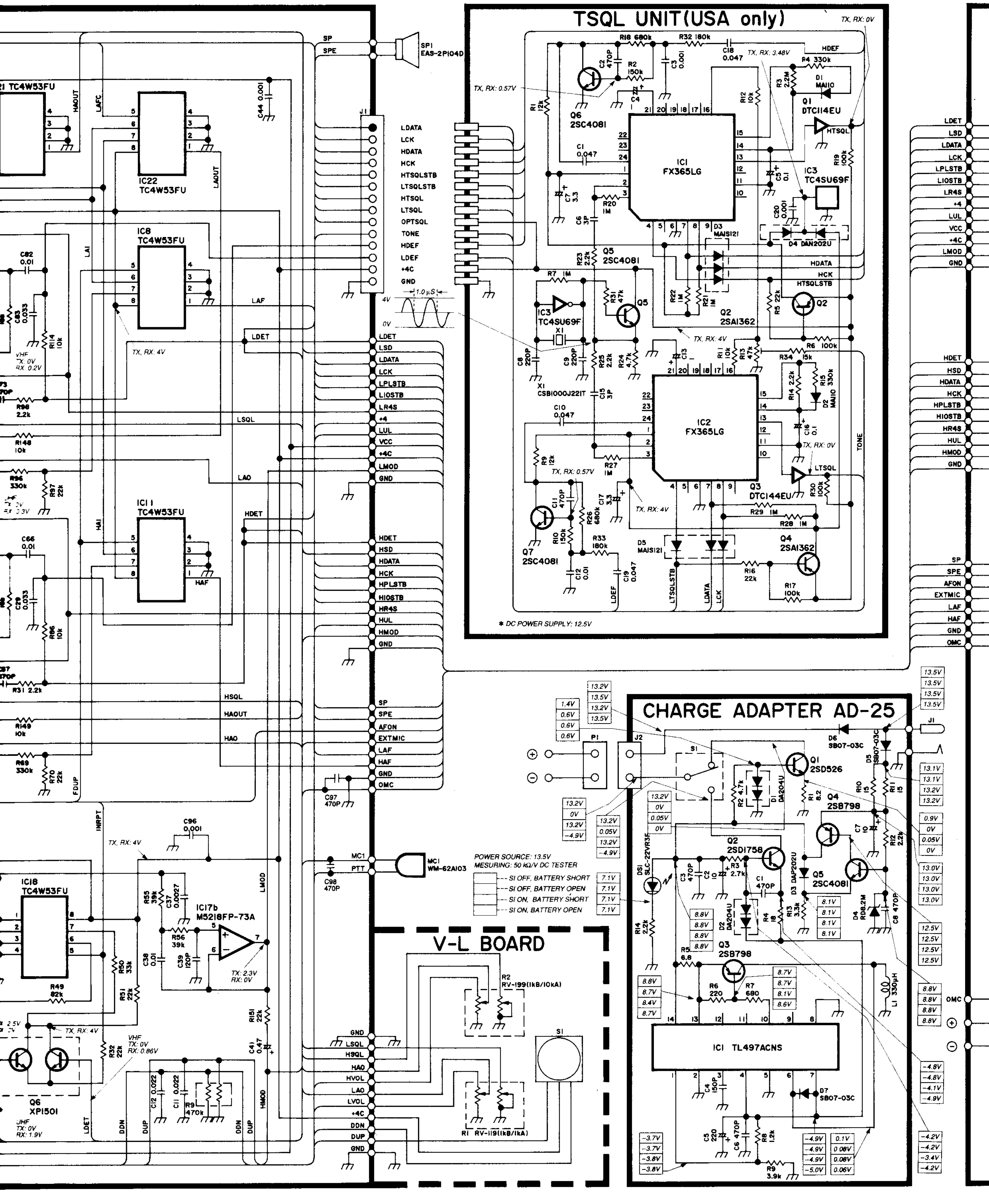
UHF RF UNIT

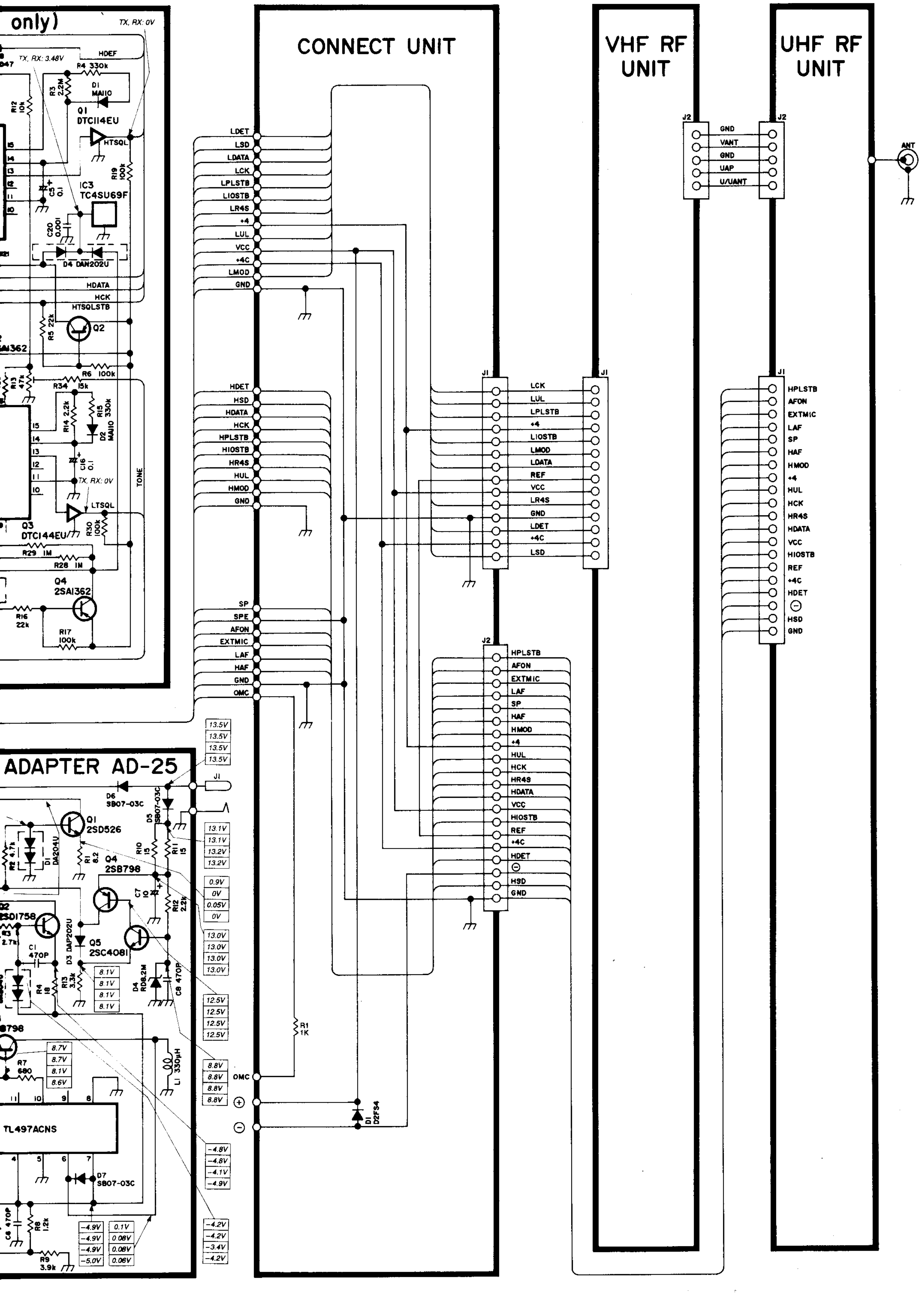
LOGIC UNIT


DSI LD-BU5545J
IC1
HD404629A59H
COM1
COM2
COM3
COM4
VI
TONEC
TONER
VTREF
LSD
HSD
VIN
REMOTE
TEST
RESET
LTSQLSTB
LIOSTB
LPLSTB
CLOCK
DATA
HTSQLSTB
HIOSTB
HPLSTB
HCK
HDATA
HBUSY
LBUSY
IOSTB
KR5
KR4
KR3
KR2
KR1
KR0
BEEP
TONE
POWER
PTT
PCON
BUSYLED
INT
R1 15k
C93 0.047
C95 0.047
C94 0.047
C1 0.047
R122 6.8k
R120 82k
R119 33k
R7 1M
CLOCK
DATA
CONT
TXLED
INSEL
TOE
IC2
M6632
IC3
M6632
IC20
TC7S04FU
R2 180k
C4 0.001
R6 1M
X1 CSAC2.00
X2 DSVT200
C7 47P
C8 56P
C9 15P
C10 15P
C90 0.001
R39 1M
Q31
UN9213
R8 1M
R144 470k
IC12
TC7S08FU
C5 0.1
R4 1M
C7 27P(JPN,EXP)
47P(EUR,UK,ITA,USA,AUS,SEA)
FUNC
POWER
+4
R16 560k
VCC
R17 10k
D4 MA110
C20 4.7
C21 0.1
R18 10k
Q2
2SA1576
D1 1SS357
R13 33k
BT1 VL1220
R14 560
C14 22
D2 1SS357
D3 1SS357
IC15
S-80735AL-AZ
IC13
S-81240PG-PJ
C15 0.01
C16 100
C17 0.001
C18 33
C19 0.001
IC14
TC7S08FU
R19 10k
Q1
XP1501
C22 0.001
C24 47
+4C
TX, RX: 4V
KR0
KR1
KR2
KR3
D22
D23
D24
D25
EUR
UK
ITA
USA
AUS
SEA
I0
I1
D22 MA132K (EUR, UK, USA, AUS, SEA)
D23 MA132WK (ITA)
D24 MA132HK (EUR, USA)
MA132K (UK, AUS)
MA132WK (SEA)
D25 MA132HK (ITA, USA, AUS, SEA)
SO
D20 MA1S121
Q28 XP1210
R135 470k
Q27 UN9210
R137 470k
Q26 XP121
R138 470k
R141 470
R146 470k
D19 MA1S121
KR3
KR4
KR5
STD
+4
DUP
DDN
KI
PTT
Q29 UN9210
Q30 UN9210
D17 MA1S121
D18 MA1S121


DSI LD-BU5545J
IC1
HD404629A59H
LBUSY
IOSTB
KR5
KR4
KR3
KR2
KR1
KR0
BEEP
TONE
POWER
PTT
PCON
BUSYLED
INT
LTSQLSTB
LIOSTB
LPLSTB
CLOCK
DATA
HTSQLSTB
HIOSTB
HPLSTB
HCK
HDATA
HBUSY
TEST
RESET
R122 6.8k
R120 82k
R119 33k
CLOCK
DATA
CONT
TXLED
IC2 M66321GP
LAFC
HAFC
LMONI
HMONI
MICM
MICC
INRPT
AFON
FDUP
IC20 TC7S04FU
IC3 M66321GP
K0
K1
K2
K3
S0
I0
I1
LMUTE
HMUTE
PD
INSEL
TOE
CLOCK
LIGHT
LDATA
IC24 TC7W08FU
DATA
LCK
BUSYLED
TXLED
C89 0.1
C88 0.1
IC4 LC7385M
R116 100k
R115 330k
R117 100k
X3 CSAC3.58
C84 33P
C85 39P
C86 0.001
R118 150K
C87 470P
IC5 TC4W53FU
+4C
LDET
HDET
INSEL
STD
TOE
IC23 TC7S66FU
TX, RX: 4V
REMOTE
HMOD
R5 2.2M
TONE
R33 50k
TCALL
R39 15K
TONE
LVOL
HVOL
R58
R40 470k
R41 220k
BEEP
R58 470k(EUR,UK,ITA)
DTMF
R21 50k
DTMF
+4C
FDUP
SO
D20 MA1S121
Q28 XP1210
R135 470k
LTSQL
HTSQL
Q27 UN9210
LUL
R137 470k
Q26 XP1210
HUL
R138 470k
R141 470k
R146 470k
D19 MA1S121
KR3
KR4
KR5
STD
I0
I1
OPTSQL
D22
D24
D23
D25
R133 47k
R134 47k
KR0
KR1
KR2
KR3
KR4
KR5
Q25 UN9210
D21 MA1S121
C91 10
D22 MA132K (EUR, UK, USA, AUS, SEA)
D23 MA132WK (ITA)
D24 MA132HK (EUR, USA) MA132K (UK, AUS) MA132WK (SEA)
D25 MA132HK (ITA, USA, AUS, SEA)
R7 1M
R139 1M
R8 1M
C90 0.001
R6 1M
CSAC2.00
X2 DSVT200
C8 56P
C9 15P
C10 15P
Q31 UN9213
C7 27P(JPN,EXP) 47P(EUR,UK,ITA,USA,AUS,SEA)
R144 470k
R16 560k
VCC
R17 10k
D4 MA110
C20 4.7
C21 0.1
R18 10k
Q2 2SA1576
IC13 S-81240PG-PJ
-AZ
IC14 TC7S08FU
Q1 XP1501
R19 10k
C22 0.001
C24 47
+4C
C17 0.001
C18 33
C19 0.001
+4
DUP
DDN
K1
PTT
Q29 UN9210
D17 MA1S121
Q30 UN9210
D18 MA1S121
PTT BOARD
GND
PTT
K0
K2
K3
KR3
KR4
KR5
POWER
FUNC
K1
INT1
+4
GND
S1
PTT
POWER
FUNC
V/M
LIGHT
H/L
S
MONI
RPT
BAND


IC24 TC7W08FU
DATA
LCK
LIGHT
BUSYLED
TXLED
C89 0.1
R123 470k
R124 180
R125 180
Q4 XP6501
R131 470k
DS2 SLM-23VMWS
Q20 2SC4081
Q21 2SC4081
Q22 2SC4081
Q23 2SC4081
R127 150
R128 150
R129 150
R130 150
DS3 LN01301C
DS4 LN01301C
DS5 LN01301C
DS6 LN01301C
TX, RX: 4V
IC21 TC4W53FU
HAFC
HAOUT
LAFC
IC22 TC4W53FU
LAOUT
IC4 LC7385M
R116 100k
R115 330k
C88 0.1
X3 CSAC3.58
C84 33P
C85 39P
KR3
KR2
KR1
KR0
IC5 TC4W53FU
+4C
LDET
HDET
INSEL
STD
TOE
LMUTE
LMONI
R103 4.7k
R104 4.7k
R105 4.7k
Q18 XP1501
Q17 2SC4081
Q16 2SC4081
VHF TX: 0V RX: 2.3V
C77 0.001
C78 0.1
R110 8.2k
R112 470k
C81 0.01
C82 0.01
LAI
IC8 TC4W53FU
VHF TX:3.6V RX: 0V
D14 DA204U
Q19 2SC4081
R100 56k
R99 120k
C75
R101 22k
D13 DA204U
R102 10k
R140 10k
C76 0.1
R106 4.7k
C79 0.001
R107 39k
C80 0.0022
R108 39k
R109 2.2k
R111 150k
R113 15k
C83 0.033
R114 10k
VHF TX: 0V RX: 0.2V
TX, RX: 4V
VHF TX: 0V RX: 0.46V
R87 22k
R88 100k
VHF TX: 0V RX: 2.2V
C67 0.1
VHF TX: 0V RX: 2.5V
C69 33P
C72 0.001
C73 470P
R98 2.2k
IC6 TC7S02FU
D12 HSM88AS
C68 0.1
R89 100k
R91 4.7k
R93 270k
R92 240k
C70 0.001
R148 10k
IC7 NJM2107F
R95 4.7k
LBUSY
MICC
R145 1M
D10 DA204U
Q15 2SC4081
R90 1M
D11 DA204U
C71 0.01
R94 240k
C74 0.01
R96 330k
R97 22k
VHF TX: 0V RX: 3V
UHF TX: 0V RX: 0.3V
IC23 TC7S66FU
TX, RX: 4V
REMOTE
HMOD
R5 2.2M
R133 47k
R134 47k
KR0
KR1
KR2
KR3
KR4
KR5
C91 10
TONE
R33 50k
TCALL
D26 DA204U
R38 22K
R39 15K
R30 27K
HMUTE
UHF TX: 3.6V RX: 0V
Q11 2SC4081
D8 DA204U
R132 56k
R71 120k
C59
R72 22k
R73 4.7k
R74 4.7k
R75 4.7k
Q13 XP1501
D9 DA204U
R76 10k
R77 10k
C60 0.1
R78 4.7k
Q12 2SC4081
C61 0.001
C62 0.1
R81 8.2k
R84 470k
UHF TX: 0V RX: 2.8V
Q14
R79 39k
R80 39k
C63 0.001
C64 0.0022
R82 2.2k
R83 150k
R85 15k
C29 0.033
C66 0.01
C65 0.01
R86 10k
Q14 2SC4081
HAI
IC11 TC4W53FU
HAF
HMONI
R60 22k
R61 100k
C51 0.1
UHF TX: 0V RX: 0.66V
C53 33P
C56 470P
C57 470P
R31 2.2k
IC9 TC7S02FU
D15 DA204U
D7 HSM88AS
C52 0.1
R62 100k
R64 4.7k
R66 270k
R65 240k
C54 0.001
R149 10k
R68 4.7k
IC10 NJM2107F
HBUSY
Q10
R63 1M
D6 DA204U
C55 0.01
R67 240k
C58 0.01
R69 330k
R70 22k
UHF TX: 0V RX: 3.6V
Q10 2SC4081
UHF TX: 0V RX: 2.1V
UHF TX: 0V RX: 3.0V
FDUP
LVOL
HVOL
R58
R40 470k
R41 220k
BEEP
R58 470k(EUR,UK,ITA)
R21 50k
DTMF
PTT
MICC
MICM
Q8 UN9211
TX: 4V RX: 0V
R25 1M
TX: 0V RX: 4V
Q7 UN9110
INRPT
C96 0.001
TX, RX: 4V
R54 330k
R43 1K
C40 0.01
IC18 TC4W53FU
R52 100k
R53 220k
R55 39k
C37 0.0027
IC17b M5218
R56 39k
+4C
IC19 TC4W53FU
OMC
MIC1
FDUP
C99 470P
R22 33k
C26 0.001
C25 0.001
C45 0.022
R24 1k
R23 1k
EXTMIC
TX, RX: 4V
R27 10k
R28 470
Q3
C28 4.7
C31 0.022
C30 0.001
TX: 3.2V RX: 4.0V
R26 1.2k
Q3 2SA1576
C27 0.047
R29 220k
R46 330(USA) 150(All other versions)
R44 150k
C32 4.7
C35 0.0047
R42 47k
C33 470P
R45 240k
C34 470P
IC17a M5218FP-73A
R48 120k
R49 82k
R50 33k
R51 22k
C38 0.01
C39 120P
R46
C36 0.1(USA) 0.22(All other versions)
R150 10k
R47 47k(EUR,UK,ITA)
TCALL
DTMF
TX: 2.5V RX: 0V
TX, RX: 4V
R32 22k
VHF TX: 0V RX: 0.86V
Q6 XP1501
UHF TX: 0V RX: 1.9V
HDET
LDET
DDN
DUP
C12 0.022
C11 0.022
R9 470k
T BOARD
V/M
LIGHT
H/L
S
MONI
RPT
BAND


TSQL UNIT(USA only)
CHARGE ADAPTER AD-25
V-L BOARD
SP1 EAS-2P104D
J1
LDATA
LCK
HDATA
HCK
HTSQLSTB
LTSQLSTB
HTSQL
LTSQL
OPTSQL
TONE
HDEF
LDEF
+4C
GND
IC1 FX365LG
IC2 FX365LG
IC3 TC4SU69F
Q1 DTC114EU
Q2 2SA1362
Q3 DTC144EU
Q4 2SA1362
Q5 2SC4081
Q6 2SC4081
Q7 2SC4081
D1 MA110
D2 MA110
D3 MA1S121
D4 DAN202U
D5 MA1S121
X1 CSB1000J22IT
TX, RX: 0.57V
TX, RX: 3.48V
TX, RX: 0V
TX, RX: 4V
* DC POWER SUPPLY: 12.5V
4V
0V
1.0μS
IC21 TC4W53FU
IC22 TC4W53FU
IC8 TC4W53FU
IC11 TC4W53FU
IC18 TC4W53FU
IC17b M5218FP-73A
Q6 XP1501
LDET
LSD
LPLSTB
LIOSTB
LR4S
LUL
VCC
LMOD
HDET
HSD
HPLSTB
HIOSTB
HR4S
HUL
HMOD
SPE
AFON
EXTMIC
LAF
HAF
OMC
MC1 WM-62A103
PTT
C97 470P
C98 470P
POWER SOURCE: 13.5V
MESURING: 50 kΩ/V DC TESTER
S1 OFF, BATTERY SHORT
S1 OFF, BATTERY OPEN
S1 ON, BATTERY SHORT
S1 ON, BATTERY OPEN
R2 RV-199(1kB/10kA)
R1 RV-119(1kB/1kA)
S1
HSQL
HAO
HVOL
LAO
LVOL
DDN
DUP
P1
J2
Q1 2SD526
Q2 2SD1758
Q3 2SB798
Q4 2SB798
Q5 2SC4081
D1 DA204U
D2 DA204U
D3 DAP202U
D4 RD8.2M
D5 SB07-03C
D6 SB07-03C
D7 SB07-03C
DS1 SLC-22VR3F
IC1 TL497ACNS
L1 330μH
VHF TX: 0V RX: 0.2V
VHF TX: 0V RX: 0.86V
UHF TX: 0V RX: 1.9V
TX: 2.3V RX: 0V


only)
TX, RX: 0V
TX, RX: 3.48V
HDEF
R4 330k
R3 2.2M
D1 MA110
Q1 DTC114EU
HTSQL
R12 10k
R19 100k
C5 0.1
IC3 TC4SU69F
C20 0.001
D4 DAN202U
HDATA
HCK
HTSQLSTB
R5 22k
Q2
2SA1362
R6 100k
R13 47k
R34 15k
R14 2.2k
R15 330k
D2 MA110
C16 0.1
TONE
LTSQL
Q3 DTC144EU
R30 100k
R29 1M
R28 1M
Q4 2SA1362
R16 22k
R17 100k
CONNECT UNIT
LDET
LSD
LDATA
LCK
LPLSTB
LIOSTB
LR4S
+4
LUL
VCC
+4C
LMOD
GND
HDET
HSD
HDATA
HCK
HPLSTB
HIOSTB
HR4S
HUL
HMOD
GND
SP
SPE
AFON
EXTMIC
LAF
HAF
GND
OMC
R1 1K
OMC
⊕
⊖
D1 D2FS4
J1
LCK
LUL
LPLSTB
+4
LIOSTB
LMOD
LDATA
REF
VCC
LR4S
GND
LDET
+4C
LSD
J2
HPLSTB
AFON
EXTMIC
LAF
SP
HAF
HMOD
+4
HUL
HCK
HR4S
HDATA
VCC
HIOSTB
REF
+4C
HDET
⊖
HSD
GND
VHF RF UNIT
J2
GND
VANT
GND
UAP
U/UANT
J1
UHF RF UNIT
J2
ANT
J1
HPLSTB
AFON
EXTMIC
LAF
SP
HAF
HMOD
+4
HUL
HCK
HR4S
HDATA
VCC
HIOSTB
REF
+4C
HDET
⊖
HSD
GND
ADAPTER AD-25
J1
D6 SB07-03C
D5 SB07-03C
Q1 2SD526
R2 4.7k
D1 DA204U
R1 8.2
R10 15
R11 15
Q4 2SB798
C7 10
R12 2.2k
Q2 2SD1758
R3 2.7k
C1 470P
D3 DAP202U
Q5 2SC4081
D4 RD8.2M
C8 470P
R4 18
R13 3.3k
2SB798
R7 680
L1 330μH
TL497ACNS
D7 SB07-03C
C4 470P
R8 1.2k
R9 3.9k
13.5V
13.5V
13.5V
13.5V
13.1V
13.1V
13.2V
13.2V
0.9V
0V
0.05V
0V
13.0V
13.0V
13.0V
13.0V
8.1V
8.1V
8.1V
8.1V
12.5V
12.5V
12.5V
12.5V
8.7V
8.7V
8.1V
8.6V
8.8V
8.8V
8.8V
8.8V
-4.8V
-4.8V
-4.1V
-4.9V
-4.9V
-4.9V
-4.9V
-5.0V
0.1V
0.08V
0.08V
0.06V
-4.2V
-4.2V
-3.4V
-4.2V

Icom Inc.

6-9-16, Kamihigashi, Hirano-ku, Osaka 547, Japan
Phone: 06 793 5302
Fax : 06 793 0013
Telex : 05277822 ICOMTR J

Icom America Inc.

〈Corporate Headquarters〉
2380 116th Avenue N.E., Bellevue, WA 98004, U.S.A.
Phone : (206) 454-8155
Fax : (206) 454-1509
Telex : 152210 ICOM AMER BVUE

〈Customer Service〉
Phone : (206) 454-7619

〈Regional Customer Service Centers〉
18102 Sky Park South, Suite 52-B, Irvine, CA 92714, U.S.A.
Phone : (714) 852-8026
Fax : (714) 852-8716

1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349, U.S.A.
Phone : (404) 991-6166
Fax : (404) 991-6327

Icom Canada

A Division of Icom America Inc.
3071 #5 Road, Unit 9, Richmond, B.C., V6X 2T4, Canada
Phone : (604) 273-7400
Fax : (604) 273-1900

Icom (Europe) GmbH

Communication Equipment
Himmelgeister Str. 100, 4000 Düsseldorf 1, F.R.G.
Phone : 0211 346047
Fax : 0211 333639
Telex : 8588082 ICOM D

Icom (Australia) Pty. Ltd.

A.C.N 006 092 575
7 Duke Street, Windsor, Victoria, 3181, Australia
Phone : 03 529 7582
Fax : 03 529 8485
Telex : AA 35521 ICOM AS

Icom (UK) Ltd.

Unit 9, Sea St., Herne Bay, Kent, CT6 8LD, U.K.
Phone : 0227 741741
Fax : 0227 741742
Telex : 965179 ICOM G

Icom France S.a

Zac de la Plaine, Rue Brindejonc des Moulinais
BP 5804, 31505 Toulouse Cedex, France
Phone : 61. 36. 03. 03 Fax : 61. 34. 05. 91
Telex : 521515 ICOM FRA

Count on us!

Icom Inc.

Icom Inc.
6-9-16, Kamihigashi, Hirano-ku, Osaka 547, Japan

A-5221MC-S
Printed in Japan
Copyright © 1993 by Icom Inc.